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W E S T E R N B L I S T E R R U S T

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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister Rust Control
Spokane, Washington

RIBES ERADICATION
A CONTRAST OF CALIFORNIA AND IDAHO CONDITIONS
W. V. Benedict

It is but natural to expect considerable variation in forest conditions and Ribes conditions in two regions located several hundred miles apart. It is the purpose of this paper to bring out briefly the more important differences in conditions affecting Ribes eradication in California and Idaho.

1. Timber species

Botanically, Idaho white pine and California sugar pine are closely related, both being members of the 5-needled soft-pine group. However, thinking in terms of Ribes eradication, this is about the extent of their likeness.

Idaho white pine occurs in even-aged relatively pure stands thruout a large part of its commercial range. Thus, there are distinct age-class stands such as reproduction stands and pole stands. The few associated species are all considered as "inferior species", that is, at the present time the white pine is the only tree marketed at a profit.

Sugar pine never occurs in pure stands, excepting occasionally on small areas of an acre or less in extent. It is found in mixture with several other species, making up from 15 to 60% of the stand. Sugar pine also occurs in uneven-aged stands, all age classes being present in the normal virgin forest. There are, therefore, no distinct age-class stands. One of the chief associated species with sugar pine is the western yellow pine, known in trade as California white pine. This species, while inferior to sugar pine, very closely approximates the sugar pine in value, and along with it is of high commercial importance. The volume of yellow pine is greater than that of sugar pine.

2. Ribes species

The four most common Ribes species indigenous to the Idaho white pine belt are: Ribes petiolare, R. inerme, R. viscosissimum and R. lacustre. The two species most susceptible to blister rust, R. petiolare and R. inerme, are practically confined to stream bottoms. Here they occur in great profusion and toxic chemicals are needed for their successful eradication. Because of their high susceptibility and restricted habitat, a high degree of protection can be given an area by stream-type eradication alone.

In the California sugar-pine region there are only two widely distributed Ribes species - R. roezli and R. nevadense, and of these two R. roezli is by far the more numerous. Other species of local importance are: R. inerme, R. viscosissimum and R. cereum.

R. roezli, with the exception of R. inerme, is probably the most

congenial blister-rust host in the region, and much the most abundant. It is not restricted to any one site but occurs not only along streams but very noticeably on dry south exposures and all exposure gradations between. For this reason stream-type eradication alone will not provide the high degree of protection such a program affords the Idaho region. However, on much of the sugar pine-yellow pine areas of the central Sierra, Ribes are very scarce, and adequate protection can be had at a cost of a few cents per acre.

In the Idaho woods almost all Ribes can be pulled by hand, excepting on areas chemically treated. In the California region the Ribes are extremely deep-rooted and heavy grubbing tools are needed to extract them. The crowns and all large roots must be removed to prevent sprouting. Where Ribes occur in rocky sites it requires several minutes to properly eradicate one bush. Because of this greater digging time for California Ribes, eradication costs for the two regions, based on number of bushes per acre, are not directly comparable.

FOREST LEGISLATION IN IDAHO

W. G. Guernsey

Forest legislation generally keeps pace with, or a little behind, the rate of forest devastation in the forested states. The legislative action in the white-pine regions of the Northwest has proven no exception. The public awakens to the need of such legislation when the lack, or increased prices, of essentials brings them into direct contact with the situation. Wood products are essential in every home, in all parts of the United States, and especially in the Northwest.

For this reason certain laws have been enacted in Idaho and a resume of several of the principal ones follows.

The essential portions of the Idaho State forestry law of 1925 are presented as follows:

The law provides for the "Creation of the office of State Forester and State Cooperative Board of Forestry having 12 members consisting of Governor, as Chairman, Attorney General, Secretary of State, State Auditor, State Superintendent of Public Instruction, State Commissioner of Reclamation, Dean of School of Forestry and four citizens of the state appointed by the Governor." Two of the four appointees are nominated by the timber protective associations, one by the livestock industry, and one by the U. S. Forest Service.

A second essential of this law deals with slash disposal. This provides that the slash created incident to logging shall be piled and burned unless another method of disposal is authorized by the State Forester.

A third essential provides that all the forest lands of the state shall be divided into districts to be known and designated as forest protective districts with a view to giving each district adequate and

effective protection, the cost to be borne equitably by all owners aided by Federal funds.

The second law, enacted in 1929 was to assist in establishing reforestation on the cut and burned areas found throughout the State. A brief sketch of some of the important points is as follows:

Due to the fact that "Cut-over and burned-over forest lands have little if any value and produce but little tax revenue to the state", it is the intent of the act to encourage the protection of growing timber and the reforestation of cut-over and burned-over lands.

Therefore, districts can be set up in the state of cut-over and burned-over lands. The owner of such land must file a petition with the State Cooperative Board of Forestry, stating that he is the owner of such lands and will accept demands made by the Board, and giving description, district, reasons for classification, etc. A hearing is then held by the Board to see if the petition is acceptable.

If this reforestation district is satisfactory to the State Board it is assessed at the rate of one dollar per acre until cut. Then a yield tax is due the county equal to 12.5 per cent of the value of such forest materials. This is based on the full current stumpage rates, the time of cutting to be determined by the State Cooperative Board of Forestry.

RIBES SEED GERMINATION STUDIES PROJECTED

Ribes-seed germination studies will be carried out on a cooperative basis at Moscow, Idaho, the School of Forestry and Physics Department of the University of Idaho and the Office of Elster-Rust Control cooperating. W. A. Rockie and D. R. Miller left on January 15 to initiate these studies. D. R. Miller will remain as chief data-taker.

The first run will comprise 10,000 seeds in lots of 50, under 200 variations. Ten crops of Ribes seeds will be studied in 2 types of soil and under 10 different temperature conditions. The 10 sets of seeds include the 1925, '26, '27, '28 and '29 crops of R. viscosissimum seeds, the 1927 crop of R. inerme, R. lacustre, R. petiolare and R. roezli seeds and the 1928 crop of R. lacustre. The soil media in which these seeds will be tested are natural peat and neutralized peat.

Ovens with thermostatic control will be used in obtaining 10 various sets of temperature conditions as follows: constant temperatures of 5°, 10°, 15°, 20°, 25°, 30° centigrade; 5° C. at night and 20° C. during the day; 5° C. night, 25° C. day; 5° C. night, 30° C. day and 10° C. night, 25° C. day.

On the completion of the study of this first set of 10,000 seeds, a second set will be run under various temperatures to be determined by the results of the first run.

APPLICATION OF POWER METHODS TO CHEMICAL ERADICATION

We are now broadcasting the final results of the experiments in power spraying carried on in 1929, as given in Swanson's annual report. If you have in or near your desk a copy of the News Letter for last month (December 1929) take another look at the map showing the 1929 eradication area. In the lower right hand corner of this map you will see a black spot marked Musselshell Ranger Station. In this region of the Clearwater National Forest, on Musselshell Creek, the power work was carried on. The main tributaries, Brown's Creek and Gold Creek were worked by knapsack spraying.

Starting at Musselshell Ranger Station approximately 8 miles of stream type was worked along Musselshell Creek. Seven miles of this was worked by power spraying methods. The width of the stream type varied from 2 chains to 14 chains with the average between 3 and 4 chains. The concentration of *Ribes* was fairly uniform and would constitute about 15% of a complete ground cover. *R. petiolare* predominated with a scattering of *R. lacustre* along the whole drainage and patches of *R. inerme* at the lower end of the area. The tributaries of Musselshell Creek were also worked. The largest of these, Gold Creek, was worked with knapsack sprayers. The smaller tributaries were eradicated by hand. On the headwaters of Brown's Creek approximately one mile of a medium concentration of *R. petiolare* was eradicated with the use of knapsack sprayers.

As the methods used in power spraying have been described in a previous news letter we are giving here only the final results of the work of this project, as follows:

Power Spraying

Area eradicated - 270 acres.
Amount of spray solution used - 10,893 gallons.
Cost per acre - \$34.79.

Knapsack spraying

Area eradicated - 99 acres.
Amount of spray solution used - 1,464 gallons.
Cost per acre - \$11.91.

Power and Knapsack Methods.

Area eradicated - 369 acres.
Amount of spray solution - 12,357 gallons.
Cost per acre - \$21.33.

Hand Pulling

Area eradicated - 373 acres.
Number of Ribes pulled - 65,731 (R. lacustre - 40,613,
R. petiolare - 23,466, R. viscosissimum - 873,
R. inerme - 809).
Number Ribes per acre - 173.
Cost per acre - \$4.46.

All Methods

Total area eradicated - 742 acres.
Average cost per acre - \$12.85.
Total area protected - 11,150 acres.
Average cost of protection - \$0.89.

The results of the work performed by the power unit, together with actual observation of the work, indicate that there is a place in the eradication program for this type of unit. Previous comparisons between work performed by this method and that done with knapsack equipment indicated that the knapsack method was the more practical. However areas similar to Musselshell Creek, with a wide stream type and heavy concentration of Ribes, can be eradicated at a reasonably low cost with the power equipment. Power units may be organized to eradicate areas comparable to that on Musselshell Creek, even though the total acreage to be eradicated amounts to only 75 or 100. The power unit can be adapted to the smaller area by reducing the 13-man unit used in 1929 to a 7-man unit, requiring only one-half of the amount of equipment used in the larger unit. The same working methods would be used, the only change being a decrease in the distance between filling stations, which is a factor which will not affect costs to an appreciable extent.

INTIMATE GLIMPSES OF OUR WASHINGTON OFFICE PERSONNEL

B. A. Anderson, in his world-wide peregrinations dropped into the Office of Blister-Rust Control in Washington, D. C. recently and gathered information from various members of the personnel on the personal history and idiosyncracies of various other members. Let Andy speak for himself:

"When McLaughlin and I left Spokane we hadn't intended to visit Washington, D. C. but after reaching New York we decided to do so. During the week spent at the Capitol we were treated royally by the staff in the Eastern Office. The personnel did everything possible to make our visit a pleasure. We left regretting deeply that a pressing engagement with Premier Mussolini demanded that we be on our way.

"Short as our stay was, however, we managed to glean a few side-

lights on the personalities of the various members.

"Mr. Posey spends the greater share of his annual leave decreasing the population of the duck marshes. Contrary to general opinion in the office, Mr. Posey uses salt after and not before.

"The 'clean desk' campaign which was instituted in the Western Office was carried East by Mr. Calhoun during his recent exchange with Mr. Avery. Mr. Pierce, who happened to be absent from the office at the time of Calhoun's debut, is still searching for various articles which he claims he left right where he could put his hands on them. After a little questioning though he broke down and admitted that the most of his pamphlets, letters, correspondence, etc., had been left on the top of his desk in a small mountain of orderly disorder so dear to the heart of the busy man.

"Jack Palmer was in France with the A. E. F. Upon hearing that we were going to Paris, he very generously offered to give us a few scorching telephone numbers. Mr. Pierce suggested, 'They're probably grown up by now!'

"Mr. Avery is the economist of the office. 'Yes, sir', he remarked philosophically as he affixed a toothpick to a cigar which was approaching a point commonly designated as 'where they taste the best', 'Some people smoke a cigar as long as they can but I smoke them as short as I can'.

"Dr. Martin is the ace of the bowling team which represents the Blister Rust Force in the league organized by the Bureau of Plant Industry employees. Mr. Detwiler is laughing up his sleeve these days. When the team was chosen he was left in the overflow due to his propensity to bowl a consistent 80 or 90. A rival organization being short a man asked him to fill in and during an important game he turned in a score of around 120. As a result there is a decided aversion among members of the team to discussing bowling in his presence.

"Mr. Ninman has recently published an article in the Journal of Forestry on his observations made while visiting the various forests in Germany that will be of interest to all blister rust men."

* * *

Goodding says: "I notice an article in the Journal of Agricultural Research on the Relation of Stomatal Behavior to Stem Rust Resistance in Wheat. In the summary it states that there is correlation between stomatal behavior and the resistance of certain varieties of wheat to stem rust.

"This article may suggest to some of our investigators a similar line of work with Ribes in relation to blister rust,"

NOTES

Roy Calhoun left on January 7 for Washington, D. C. to assume the duties of Administrative Assistant in the Office of Barberry Eradication. Good luck, Roy!

* * *

On December 18 a radio talk on blister rust was given by Root at the studio of the California State Department of Agriculture in Sacramento.

* * *

Frank Patty seems to be thoroughly proselyted; his opening remarks on California Ecology to the personnel conference were "I haven't any charts or tables with me today BUT I'll draw you a map of California." Incidentally, California appears to be in bad shape.

* * *

Miss Eleanor Davidson has been appointed stenographer at Berkeley, California, effective January 2, 1930.

* * *

During the Christmas holidays Ed. Joy and Andy Staat automatically resigned from the Bachelors' Club. Joy was married in Oregon City, Oregon; Staat in Missoula, Montana. Congratulations, boys!

* * *

The District 1 Investigative Council met in Spokane, Washington, January 20 for a three-day discussion of forestry and allied subjects. Investigative lines were discussed and plans made for a continuation of the work. The primary purpose of the conference was to acquaint members with the work of various organizations in order to prevent duplication of efforts.

The conference was attended by U. S. Forest Service officials and representatives of cooperative organizations including the University of Montana, University of Idaho, Weather Bureau, Bureau of Plant Industry, Bureau of Entomology, Mason and Stevens, consulting Foresters, and The Western Conservation Association.





W E S T E R N B L I S T E R R U S TN E W S L E T T E R

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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Elister-Rust Control
Spokane, Washington

RE-ERADICATION STUDIES ON HAND ERADICATED AREAS

On an area in the Coeur d'Alene National Forest worked in 1926 at a cost of \$2.41, re-eradication was done in 1929 at a cost of \$.59; 43.9 Ribes and 46 feet of live stem per acre were pulled in 1929 from this area which yielded 186.3 bushes and 2,794 feet of live stem in 1926.

This work was done on the area drained by the Little North Fork of the Coeur d'Alene River centering around Honeysuckle Ranger Station. Re-eradication work was initiated in order to determine the average cost per acre for the first re-eradication of Ribes in various eradication types, the protection afforded an area in terms of amount of Ribes left, what eradication types are protected adequately by one eradication of Ribes and to study the growth and survival of Ribes which germinate along chutes and skidways for varying periods following logging.

Results, by types, are given in the following table:

COMPARATIVE RESULTS OF RIBES ERADICATION IN 1927
AND RIBES RE-ERADICATED IN 1929.

Eradication Type	Acres	Ribes Pulled 1929		Ribes Pulled 1927		Live Stem Per Acre		Cost Per Acre	
		Total	No. Per Acre	Total	No. Per Acre	1929	1927	1929	1927
Stream	193.7	13,035	67.3	109,929	567.5	123	11,350	\$2.71	\$14.53
D.M.	146.5	41	0.3	1,486	10.1	2	212	.23	.52
O.M.	1,632.2	8,852	5.4	76,864	48.3	47	676	.34	1.24
D.P.	445.5	1,740	3.9	29,912	67.1	12	872	.40	.81
O.P.	153.9	1,526	9.9	11,936	77.6	3	388	.48	1.67
D.R.	494.0	104	0.2	10,844	22.0	59	330	.11	1.33
O.R.	80.0	1,752	21.9	12,639	158.0	43	1,738	1.55	6.11
CO.	1,554.0	179,303	115.4	621,822	400.1	43	3,200	.78	2.93
All Types	4,699.8	206,353	43.9	875,432	186.3	46	2,794	\$.59	\$2.41

Of the total number of Ribes pulled in 1929 by re-eradication crews 92% were seedlings, 1 per cent sprouts and 7 per cent bushes missed by original eradication crews in 1927.

Studies of growth and survival of Ribes along chutes and skidways were confined to two areas on which logging took place in 1917 and 1926. 9 acres of the area logged in 1917 contained 5,280 Ribes or 587 per acre with 87,205 feet of live stem or 9,690 feet per acre. Four acres worked on the 1926 logging area contained 3,057 bushes or 764 per

acre with a total of only 255 feet of live stem or 64 feet per acre.

Conclusions resulting from this experiment are:

1. Although germination of Ribes seeds on the 1926 cut-over area had apparently ceased (no bushes were found of 1929 germination) most of the bushes which germinated in 1928 and some of those which germinated earlier were so small that too many were missed. Eradication the fourth year following logging and brush disposal would no doubt be feasible.
2. The amount of Ribes live stem per acre on the 1926 logging area is so small that eradication could be delayed to the fourth or fifth year without danger of great volumes of sporidia being produced on the leaves of Ribes seedlings.
3. Although there were fewer Ribes per acre on the twelve-year cutting the bushes were of such size and the difficulty of working so great that the average cost per acre was much greater than on the three-year cutting. Hence twelve years is far too long to wait both from the standpoint of cost of eradication of Ribes and from the standpoint of potential production of sporidia on the blister-rust infected Ribes leaves.

HOW LONG DOES PINUS MONTICOLA HOLD ITS NEEDLES?

R. E. Myers

The length of time which P. monticola retains its needles is shown in the table given below which was made up from a study of 705 trees at Newman Lake, Washington.

No. of Years Needles re- tained	Percentage by Crown Classes			
	Dominant	Intermediate	Suppressed	Total
2	0	0	9	5
3	14	5	15	12
4	53	30	24	30
5	29	46	31	34
6	3	16	17	15
7	1	2	4	3
8	0	1	0	.1
	100	100	100	100

This table indicates that P. monticola bears its needles 4 to 5 years on the average but tends to hold them longer if overtopped.

PINUS STROBUS IN MONTANA

C. H. Johnson

Back in 1909, Sylvanite, located in the Kootenai country on the Yaak River, was a prosperous mining town. The founders hailed from the Lake States, principally Michigan, and were familiar with the part that white pine had played in the building of towns in that region.

With the aid of a Michigan forester white-pine seedlings (Pinus strobus) were shipped in and planted. The old timers undoubtedly visualized a day far in the future when the lumber from this historic species would again play an important role in the upbuilding of this new region. Who knows but what their dreams may materialize?

The old town of Sylvanite has disappeared and is almost forgotten but the pines live on and are holding their ground.

The following information and figures were taken from the Forest Service planting records: 1,210 - 4-year-old P. strobus were planted over an area of 3.7 acres. 75 per cent of the original number were living in the fall. One year later the figure was 70 per cent. In 1919, 61 per cent of the stand were alive. These records compare favorably with the survival records of western white pine. Many of the trees are now 30 to 35 feet in height and one measured $5\frac{1}{2}$ inches at breast height. The trees (P. strobus) have made double the growth of the native white pine of about the same age intermingled with them.

In 1928, H. N. Putnam and writer examined the plantation and found the eastern white pine in a very healthy condition and towering above their western rivals.

DUSTING - A POSSIBLE METHOD OF ERADICATION

J. F. Breakey

Although efforts along lines of chemical eradication of Ribes had been confined largely to the application of Ribicides in solution or spray form, some consideration has been given to the possibility of applying chemicals in dust form. Applications have not been made on a sufficiently large scale to obtain conclusive results due to difficulties met in securing desired killing agents in form for dusting. However, it seems that the time is ripe for a thorough investigation into the possibilities of dusting as a Ribes eradication measure. The Western Office of Elister-Rust Control plans to go ahead with

investigations and the writer has begun a study of equipment and reports of experiments carried out with dusting apparatus in order to gather information as a basis for the building of a small portable duster for blister-rust control tests during the coming field season.

Through experiments with equipment for dusting small vegetation - covered bodies of water, using Paris Green as an anopheline larvicide, the U. S. Public Health Service has developed a light portable power blower which can be operated by one man and the whole unit set in a small boat. Material costs were as low as 15 cents per acre. Moderate breeze velocities, not over seven or eight miles per hour were most satisfactory. In a breeze of less than two miles per hour the nozzle should be elevated. In a moderate breeze a 15 per cent Paris Green mixture gave a lethal path at least 525 feet wide.

Careful checks on densities of larvae in the water were made before and after dusting. All of the area was covered at a low cost per acre. A small motor (.80 H.P.) supplied ample power which would lead us to believe that one of the small one-cylinder motors which we now have on hand could furnish power for a duster of sufficient capacity to cover at one time any Ribes area that has so far been found.

Offers of the use of dusting equipment for experimental purposes have been made by the Chipman Chemical Engineering Company, manufacturers of Atlacide, The Feeny Manufacturing Company of Munich, Indiana, and Mailliard and Schmidell, Importers, San Francisco, California, who handle the Grun duster, made in Germany.

The Chipman Chemical Engineering Company has a knapsack duster which has given the following results in recent tests with Atlacide.

1. The machine will dust quantities of 1/2 to 1 pound of Atlacide satisfactorily over an area of about 100 square feet in about 45 seconds.
2. Duster will give uniform distribution over this area.
3. Sprayer can apparently be operated for a considerable length of time without clogging.
4. The duster can be stored at night and used again the next day without being cleaned.

5. Weight of machine empty - $16\frac{1}{2}$ pounds.
6. Weight of machine full - approximately 43 pounds.
7. Weight of charge of Atlacide - approximately 26 pounds.
8. Cost of machine - approximately \$18.00.

Mr. B. P. Webster, Vice-President of the Chipman Company, reports in part, "From all tests conducted by ourselves and various State Experiment Stations, the effectiveness of Atlacide when applied as a dust is fully equal to that when applied as a spray. We therefore feel that the problem merely resolves itself into the obtaining of suitable equipment for distributing the dust. In other words, we do not feel that any further field tests are necessary to establish the effectiveness of Atlacide in dust form".

On a 40 per cent concentration area at Morro Bay, California, approximately .18 gallon of spray was used on 100 square feet. This amounts to about .17 pound of chemical (10% solution) on a 40% Ribes area (computed from acreage report). There may be a place for dusting methods on such areas and equipment will be developed for experimental application by this method.

SOME RESULTS OF CHEEKYE PLOT STUDIES, CHEEKYE, B. C.

At the February personnel meeting Ed. Joy gave us some interesting data resulting from studies of conditions on the Cheekye Plot. He outlined briefly the manner in which the plot was laid out and showed that in the $3\frac{1}{2}$ years since the pines were planted 8.1 per cent of the pines have become infected and 12.8 per cent of the infected pines have been killed by blister rust.

The Cheekye Plot is a circular plot with a radius of 18.94 chains. Ribes were removed from the plot by several eradications. One row of pines was planted along each of eight radii and extended beyond the circumference for distances varying from 5 to 15 chains. For purposes of comparison the area was considered as three zones; (1) the portion beyond the circumference in which pines were planted and from which Ribes were not eradicated; (2) the protection zone, a strip within the circumference 920 feet in width; (3) the area protected, an inner circle 330 feet in radius.

Data secured by a study of infection conditions showed that a protection strip of 920 feet or even 1,250 feet is not sufficiently wide under conditions obtaining at Cheekye. Interesting

data were procured on the survival of planted pines and the mortality of pines which became infected.

In the spring of 1926, a total of 4,965 pines was planted in the area. In the fall of 1927, 83.7 per cent of these pines were living; in the fall of 1928, the survival was 82.3 per cent and in the fall of 1929, approximately 81.7 per cent or 4,054 pines had survived.

Of these 4,054 pines, 328 or 8.1 per cent were infected with blister rust as follows: 105 or 8.5 per cent of the 1,239 pines outside the plot, 167 or 8.2 per cent of the 2,045 pines in the protection zone and 56 or 7.3 per cent of the 770 pines in the inner circle.

Of the 328 infected pines, 42 had been killed by blister rust. This represents 12.8 per cent of the infected pines or one per cent of all planted pines.

These data, taken only $3\frac{1}{2}$ years after planting, indicate that a large percentage of white-pine planting stock will be killed by blister rust within the first ten years if planted in a region where infection is already established, and if adequate protection is not given them.

HEPTANE FROM CALIFORNIA PINE TREES

G. A. Root

The above is the title of an article appearing in the November issue of the Forest Worker explaining the use to which a product of the resin of two well known pines can be put in the commercial field. One of these trees is the Jeffrey pine, Pinus jeffreyi, and the other, the lesser known but interesting Digger pine, P. sabiniana. The former is found along the higher ranges of the state while the latter is found along the foothills. It is the first species of pine found on leaving the great valley floor of central California and its grayish-green foliage and straggling appearance never fail to evoke comment by persons first making trips to the mountains. This pine has been largely used for fuel wood.

The resin of the Jeffrey and Digger pines was known to have a curative value for cuts and abrasions as early as Civil War days. About twenty years after, the distillation of this resin revealed a hydrocarbon which was given the name of Heptane. At that time it was considered a chemical curiosity. This product is obtained in the distillation of

petroleum and in conjunction with a closely allied hydrocarbon, its use in a commercial way seems assured in measuring the knock of various gasolines. The recovery of Heptane from petroleum is very difficult but the ease with which it can be obtained from pines has opened up this source of supply rather extensively. Experimental work is being carried on by the California Forest Experiment Station. The method of obtaining the resin is by chipping the bark, similar to the process used in the turpentine woods of the South.

The thoughts to be conveyed from this article are first--that an inferior species of tree may suddenly become one of marked utility, and second--it is not beyond the realm of possibility that the resin of sugar pine may sometime be found to contain a highly useful product. This coupled with its present importance as a timber tree would make it that much more valuable.

NOTES

S. N. Wyckoff attended the District 5 Investigative Meeting at San Francisco, California, January 27-29. He proceeded thence to the Washington Office to discuss plans for the coming year's work with Mr. Detwiler, Mr. Posey and Dr. Martin.

* * *

H. N. Putnam left on February 7 for Washington, D. C. where he plans to take a course in Statistical Methods after which he will visit eastern infection centers.

* * *

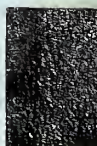
Born - January 31, 1930 to Mr. and Mrs. R. L. MacLeod, a son.

* * *

On January 20, C. H. Johnson gave a blister-rust talk to members of the Federal Business Men's Association at Missoula, Montana.

* * *

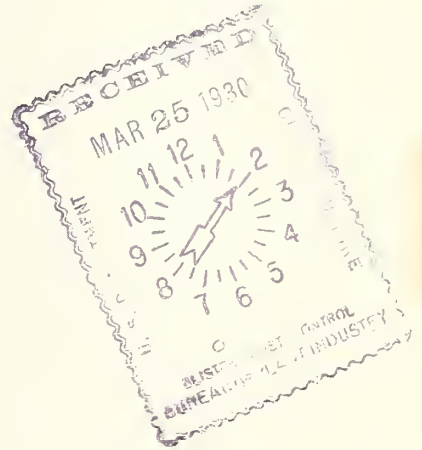
C. O. Peterson and Miss Eileen Wevley were married in Portland, Oregon on February 1. Congratulations, Pete!





WESTERN BLISTER RUSTNEWS LETTER

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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister-Rust Control
Spokane, Washington

WHAT BASIS SHALL BE USED TO ESTIMATE
RIBES ERADICATION COSTS IN THE INLAND EMPIRE

C. C. Strong

In the April, 1927 issue of the Western Blister-Rust News Letter there appeared an article written by S. B. Detwiler entitled "What Basis Shall be Used to Estimate Eradication Costs". At the time this article appeared it was definitely known that the application of any method of estimating costs of Ribes eradication patterned after results of work done to that time was not feasible, for several reasons. All the hand pulling of Ribes done during the period 1923 to 1926, inclusive, was done within the outer boundaries of what was then the Kaniksu National Forest. Conditions affecting cost of Ribes eradication differed greatly in other regions. No Ribes petiolare occurs on this Forest. The south half of the Idaho white-pine belt abounds in that species. Great concentrations of this Ribes species occur along many of the streams and their tributaries.

In 1927, successful application of chemical eradication as a practical means of destroying Ribes seemed only a remote possibility. During the intervening span of three years, from 1927 to the present, the seemingly impossible has been done and chemical eradication of R. petiolare is now the only correct method recognized except where a few small bushes occur scattered widely over any area. Where those heavy concentrations of R. petiolare would have been hand pulled at a cost of \$50 to \$150 or \$200 per acre three years ago, chemical eradication is now successfully done at a cost of \$10 to \$25 per acre. Hence it becomes at once evident that it is now possible to make a very accurate estimate of the cost of Ribes eradication for any region in the Inland Empire, whereas similar attempts in April, 1927 would have been out of the question.

Mr. Detwiler, in the item referred to above, stated that in order to draw out facts he would take the position that the proper unit for estimating costs is feet of live stem and that eradication types may be disregarded if a table similar to the one presented is developed for the general region. Results secured in the West since 1927 seem to indicate that variability of important factors other than feet of live stem will make it impossible to use it as a single index in estimating costs as will be shown later in this article.

One question asked in the article referred to was "What is the cost of uprooting and disposing of the Ribes bushes as compared to the cost of walking over the ground and locating the bushes?" This question was answered on page 118, Plate VII of the 1928 Annual Report of the Western Branch, Office of Blister-Rust Control. The following table is a brief summary:

TABLE NO 1

ANALYSIS OF TIME SPENT BY CREW MAN ON RIBES
ERADICATION BY HAND-PULLING METHODS

Eradication Type	No. Ribes Pulled Per Acre	Percentage Crew Man's Time Spent			Pulling Time Per Bush
		Traveling	Pulling	Searching	
Dense Pole	30	27	6	67	12 seconds
Open Mature	106	14	14	72	14 "
Open Reproduction	166	14	23	63	24 "
Stream	480	10	28	62	36 "

Data were not secured for all types. The striking point is the relatively high percentage of time spent searching for bushes even on areas with a high Ribes population. A second important point is that there are two factors affecting pulling time, (1) number of Ribes per acre and (2) eradication type as reflected in size and firmness of rooting of bushes.

The next question to be considered was "Is the cost of eradicating a hundred feet of Ribes live stem a constant figure, or does it decrease as the number of feet of live stem per acre increases? If the latter, what is the reason that wholesale eradication is cheaper per unit of live stem - is it because each bush requires less effort to eradicate it than where there are fewer bushes, or is it because labor is more continuously and effectively employed where Ribes growth is heaviest?"

Results shown in Tables No. 1 and 2 answer this question for the Inland Empire. The writer prefers to use 1,000 feet of live stem as a unit rather than 100 feet.

TABLE NO. 2

COST OF RIBES ERADICATION PER THOUSAND
FEET OF LIVE STEM PULLED

Eradication Type	1926		1927		1928	
	Cost Per 1000 Feet Live Stem	Feet Live Stem Per Acre	Cost Per 1000 Feet Live Stem	Feet Live Stem Per Acre	Cost Per 1000 Feet Live Stem	Feet Live Stem Per Acre
Dense Mature	\$ 7.27	44	\$1.73	421	\$ 1.29	372
Open Mature	4.63	149	1.74	713	1.23	1,403
Dense Pole	5.75	92	1.54	526	2.33	437
Open Pole	7.77	103	6.00	131	5.71	196
Dense Reproduction	4.41	256	2.84	538	1.68	1,093
Open Reproduction	12.39	67	2.38	2,255	16.55 *	55
Cut-over			1.48	2,574	1.50	1,051
Stream	1.04	9,453	1.15	11,036	1.02	8,742

*Based on only three acres worked.

Careful analysis of and construction of curves from this table reveals

the fact that no uniformity can be secured from any logical way of arranging the figures other than by eradication types. Then and then only is there a consistent lowering of eradication costs in nearly all cases per unit of live stem as the amount of live stem per acre increases. The conclusion the writer draws from these figures is that eradication costs cannot be estimated on the basis of feet of live stem per acre without giving due consideration to eradication type. However, estimating the number of feet of live stem per acre in advance is very seldom feasible in the Inland Empire so it becomes necessary to look still further for a basis for estimating costs.

There is no way to account for the lowering of eradication costs per unit of live stem with increasing of live stem per acre other than that the labor is more continuously and effectively applied.

The final answer to the question "Is live stem the proper unit for estimating per acre cost of eradication rather than number of bushes?" is very difficult to give. When a person makes ocular estimates, as is now being done on pre-eradication in north Idaho, his judgment must be tempered by experience. The keenness to which his judgment is tempered depends on the accuracy of his information. His information is based on results of past work. That information consists of the important facts, or factors let us say, which he readily converts into terms of probable future costs of Ribes eradication. Therefore, information such as is given in Table No. 2 is of vital importance to him.

Analysis of the data shown in Table No. 3 reveals very nearly the same relationship between costs and number of bushes per acre that is shown in Table No. 2 between costs and amount of live stem per acre. Hence both factors are important in estimating future costs but apparently one is more important than the other. Furthermore, factors other than number of bushes and feet of live stem per acre must be considered.

TABLE NO. 3

COST OF RIBES ERADICATION PER 100 BUSHES PULLED

Eradication Type	1926		1927		1928	
	Cost Per 100 Bushes Pulled	Number Bushes Per Acre	Cost Per 100 Bushes Pulled	Number Bushes Per Acre	Cost Per 100 Bushes Pulled	Number Bushes Per Acre
Dense Mature	\$14.50	2.2	\$3.60	20.4	\$ 2.70	18.0
Open Mature	6.60	10.5	2.50	50.3	1.70	99.0
Dense Pole	7.40	7.2	2.00	40.9	3.00	34.0
Open Pole	2.80	28.0	2.80	27.3	2.60	43.0
Dense Reproduction	6.80	16.6	4.60	34.3	2.60	71.0
Open Reproduction	5.90	14.0	2.60	205.0	18.20*	5.0
Cut-over			1.10	333.4	1.20	136.0
Stream	2.30	434.2	2.30	560.2	2.00	444.0

*Based on only three acres worked.

The data shown in Tables No. 2 and 3 were based on the following acreages worked:

TABLE NO. 4

ACREAGE OF EACH ERADICATION TYPE WORKED

Eradication Type	Acreage Eradicated By Years			
	1926	1927	1928	Total
Dense Mature	465.00	2,269.1	2,045.1	4,779.20
Open Pole	4,300.87	1,177.0	1,162.6	6,640.47
Dense Reproduction	940.50	1,209.4	478.8	2,628.70
Dense Pole	1,612.00	1,320.3	891.3	3,823.60
Open Mature	573.00	5,357.5	2,863.6	9,794.10
Open Reproduction	472.00	618.3	3.0	1,093.30
Cut-over	-	2,482.5	2,963.1	5,445.60
Stream	501.63	987.9	1,427.5	2,917.03
All Types	8,865.00	16,422.0	11,835.0	37,122.00

In summarizing the progress made in eradication of Ribes in the Inland Empire by either hand-pulling or spraying methods, for the purpose of capitalizing on the important factors for consideration in estimating future costs for similar work, two outstanding points are noted. The first is that no one factor has so far been discovered which will serve as a sole basis for such estimates. The second outstanding point is that it has been possible for men experienced in Ribes eradication to make very accurate estimates, as shown by the results on two areas worked where pre-eradication estimates had been made the previous fall.

One area, embracing 10,000 acres of the Marie Creek drainage, on the Coeur d'Alene National Forest, was pre-eradicated in the fall of 1927 and cost of Ribes eradication was estimated at \$1.26 per acre. In 1928, about 6,000 acres of this drainage, including the most difficult part, were eradicated of Ribes at a cost of \$1.39 per acre. Had the whole area been worked, it is very certain that the resulting cost would have been very close to the previously estimated cost.

The second area on which actual eradication costs checked very closely with estimated costs was the Musselshell Creek drainage on the Clearwater National Forest. In the fall of 1928 stream type pre-eradication was conducted on about 90,000 acres of the Musselshell District of which Musselshell Creek is a part. The method used was described in the 1928 Annual Report and will not be repeated here. 11,150 acres of the Musselshell Creek drainage were partially protected by the eradication of Ribes from stream type in 1929. The estimated cost of stream type Ribes eradication for the whole 90,000 acres when applied to the entire area given protection was \$0.59 per acre. The actual cost in the portion of the Musselshell Creek drainage worked in 1929 was \$0.89 per acre. However, the area worked was chosen because it represented by far

the heaviest and most extensive concentrations of Ribes to be found in the district as a suitable area for further development of power-spraying equipment and methods. The original estimate on cost of stream-type eradication on the Musselshell Creek drainage alone was \$1.00 per acre.

However desirable it might be to find some factor which might be used accurately in estimating Ribes eradication costs, the fact remains that if such a factor does exist, no one is yet within grasping distance of it. Furthermore, until that factor is found, estimating of Ribes eradication costs will have to be done by men with sufficient experience on such work to properly correlate the conditions encountered with factors affecting cost of Ribes eradication.

THE EDDY TREE-BREEDING STATION

G. A. Root

Situated 60 miles east of Sacramento, California in the lower range of yellow pine in the Sierra Nevada, is perhaps one of the most unique forestry establishments in the country. Sponsored and financed by Mr. Jas. G. Eddy, a wealthy lumberman of Everett, Washington, this institution has for its primary interest the production of forest trees of a superior quality and growth, through breeding and selection along the same principle that Burbank attempted with flowers and shrubs. In other words, an endeavor will be made to develop more rapid-growing strains of trees that will reach merchantable size in a shorter time and that will have wood of good quality. Some of the results are hoped to be attained by hybridization, by selection, and by comparative tests of wild seed, selected seed, and hybrid seed.

The work of the station is concentrated largely on the genus Pinus. An arboretum is being established which it is hoped will contain all known species of pines. Seed has been secured thus far of 82 species and varieties of pine from many parts of the world. The hard pines will receive the most attention though some work will be done with the soft or white pines. The station is desirous of obtaining protection from blister rust and preliminary plans have already been made for a safety zone.

The station was established in 1925, the site selected consisting of 65 acres where favorable conditions were found. It is situated in the center of the most rapid-growing yellow pines in the state, at an elevation of 2,700 feet. The climate is comparatively mild, making it possible to grow exotic species, many from southern climes. Soil, topography and water supply approach the ideal for carrying on this type of work.

The station is in charge of a Director, with a Forester and Propagator making up the technical personnel. Considerable temporary help is required at certain times of the year. A cordial invitation to visit the station is extended to all those interested.

SUSCEPTIBILITY OF PINUS MONTICOLA TO
BLISTER RUST BASED ON LENGTH OF TIME NEEDLES ARE RETAINED
R. E. Myers

Data collected on the Newman Lake infection area, regarding the length of time various classes of white pines retain their needles, reveal some interesting sidelights in terms of susceptibility to blister rust. A study of the 705 white pines on the area, divided into crown classes and needle-retaining age classes, gives a definite indication as to what may be expected in the way of pine infection.

The following table gives the number of infected trees and the per cent of trees infected in each class:

PER CENT OF TREES INFECTED BY CLASSES

No. of Years Trees Retain Needles	Crown Classes									Totals		
	Dominant			Intermediate			Suppressed					
	No. Trees	No.of Trees Inf.	% of Trees Inf.	No. Trees	No.of Trees Inf.	% of Trees Inf.	No. Trees	No.of Trees Inf.	% of Trees Inf.	No. Trees	No.of Trees Inf.	% of Trees Inf.
2	0	0	0.0	0	0	0.0	38	0	0.0	38	0	0.0
3	18	0	0.0	9	0	0.0	61	0	0.0	88	0	0.0
4	67	25	37.3	50	5	10.0	98	1	1.02	215	31	14.4
5	36	12	33.3	77	8	10.3	126	3	3.1	239	23	9.6
6	4	2	50.0	28	3	10.7	72	3	4.2	104	8	7.7
7	1	1	100.0	3	3	100.0	15	2	13.3	19	6	31.5
8	0	0	0.0	1	0	0.0	1	0	0.0	2	0	0.0
Totals	126	40	31.7	168	19	11.3	411	9	2.2	705	68	9.6

It is significant that no infected trees on the plot retained their needles less than four years. The data show that 40 of the 68 trees infected are in the dominant class and that 39 of the 40 hold their needles from 4 to 6 years inclusive. Only two of these are in the six-year group.

The four and five-year dominant group holds the bulk of the infection with a much wider differential between the dominant and intermediate classes than between the intermediate and suppressed.

It would appear that the needle-retaining habit is a factor in the relative susceptibility within the species as well as being a significant factor in differences indicated between Pinus monticola and P. strobus on the Buck Creek and Pysht infection areas.

TEST-OUT DUSTER

Preliminary tests of the American Beauty duster, a product of the Chipman Chemical Company, were made March 13 by Mr. C. B. Ahlson, Company

representative and Frank Breaky. Observations of the machine in use indicate that it may have a place in our eradication program. Atlacide was used during the test.

The machine, weighing about 16 pounds empty, is of the knapsack variety and has a capacity of 26 pounds of chemical. Further testing will be done before the field season opens.

NEW CANKERS PLENTIFUL

L. N. Goodding

Blister rust is running hog wild in the Rhododendron region of Oregon. On March 5, some very casual observations were made in that region. Hundreds of cankers not visible last fall are clearly visible now. It is hoped that we may be able to put up some signs and have a few plots open to the public which will be educational. It will not be surprising to have many banner blister rust years in the near future.

NOTES

W. A. Rockie left March 13 for Washington, D. C. to work up and summarize all ecological data collected in the West during the last five years.

* * *

R. L. MacLeod has taken over the duties of administrative assistant, which have been in the hands of W. V. Benedict since Roy Calhoun left to take over new duties at Washington, D. C. All of which leads to the statement that the News Letter has fallen into new hands. Kermit Miller is now in charge of educational work in the Spokane Office. Lots of luck in the new work, Brick!

* * *

Miss Alice Fellows left the office February 28, and departed immediately for Seattle.

* * *

H. R. Offord arrived in Spokane, Wednesday February 26, and spent Thursday with S. N. Wyckoff going over the work at Moscow, Idaho. He departed for the sunny south March 2.





WESTERN BLISTER RUST

NEWS LETTER

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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister-Rust Control
Spokane, Washington

PROGRESS OF RIBES GERMINATION STUDY

D. R. Miller

The Ecology Project had advanced far enough in its field studies, by the fall of 1929, to see that a *Ribes* seed germination study would be necessary before any definite conclusions could be made about the management of stands as a means of blister-rust control.

The seed were put in their respective chambers March 13, 1930, and the first germination started March 19. In nearly all cases, 1925 and 1926 *Ribes viscosissimum* seed germinated first in each temperature chamber; and 1929 seed of the same species was the last to start of the species that have showed any results so far: This was the only set of 1929 seed used in the study.

The study, as it is being carried on, consists of ten trays. Each tray has a duplicate set of the following dishes of 50 seeds each: 1927 *R. roezli*, 1927 *R. inerme*, 1927 *R. petiolare*, 1927 and 1928 *R. lacustre*, 1925, 1926, 1927, 1928, and 1929 *R. viscosissimum*, making a total charge of 20 dishes per tray, ten dishes of natural and ten of neutral peat. The trays were put in the following centigrade temperature chambers: 30° constant, 30° during the day and 5° at night; 25° constant, 25° during the day and 10° at night; 25° during the day and 5° at night; 20° constant, 20° during the day and 5° at night; 15° constant; 10° constant, and 5° constant. The trays with the alternating temperatures are changed every twelve hours. Using the above combinations, each species and year of seed are tested in both natural and neutral peat for each temperature.

TABLE NO. 1

GERMINATION BY TEMPERATURE

Temperature *	No. of Seeds by Species by Germination Medium									
	R. vis.		R. lac.		R. iner.		R. pet.		R. roez.	
	Nat. Peat	Neut. Peat	Nat. Peat	Neut. Peat	Nat. Peat	Neut. Peat	Nat. Peat	Neut. Peat	Nat. Peat	Neut. Peat
30° - 5°	-	1	-	-	-	-	-	-	-	-
25° Con.	-	2	-	-	1	1	-	-	-	-
25° - 10°	-	19	-	1	4	-	-	-	-	-
25° - 5°	-	25	-	3	4	1	-	-	-	-
20° Con.	-	1	-	-	-	-	-	-	-	-
20° - 5°	-	18	-	4	3	1	-	-	-	-
15° Con.	-	1	-	-	-	-	-	-	-	-
Total	-	67	-	8	12	3	-	-	-	90

*All temperatures are in centigrade.

TABLE NO. 2

GERMINATION BY YEAR

Year	Germination by Species by Years				
	R. vis.	R. lac.	R. iner.	R. pet.	R. roez.
1925	13				
1926	12				
1927	9	8	15	-	-
1928	22	-			
1929	11				
Total	67	8	15		

It appears, at first glance, as if there aren't enough seed germinated to form even an opinion; but what seed have germinated have done so in a very short range in temperature. This brings it down to two chambers, and still further, to three trays; of these trays, one dish shows, at the present date, a germination of 22%. Thus the small amount of seed sprouted (small when compared with all the seed used) shows a fair per cent of germination when confined to their own chambers. Nothing can be said about the viability of seed of individual years, as the dishes of the 1929 seed have just started germinating. R. lacustre and R. inerme have just recently started, and their highest record of germination for individual dishes is 8% each. R. roezli and R. petiolare show no germination at present.

Although not many seeds have germinated at this time, what have germinated show uniformity in their results, as follows:

1. That the seed prefer a neutral medium.
2. That the seed prefer alternating temperatures.
3. That the seed prefer the 25° and 20° temperatures even when alternated.
4. That the temperatures above 30° and below 15° are unfavorable for germination even though they are alternated with lower temperatures.
5. Also that a resting period is needed for seed.

The above uniformities are only indicators as the study has not progressed far enough to enable the drawing of final conclusions.

IDENTIFY CANKER DISEASE

L. N. Goodding

Atropellis pinicola has gone to press. It is a canker disease of pines which has passed for several years as Scleroderris bacillifera. It is very common on western white pine west of the Cascades, and has been found in Idaho. Rather recently it has also been found on lodgepole pine and on sugar pine. It "flags" the trees much the same as blister rust does, but the fruiting bodies are black instead of orange.

A very similar disease in outward appearance attacks mostly lodgepole pines. This is Cenangium piniphilum.

NEWMAN LAKE PLOT CONDITIONS

R. E. Myers

Aerial production on the Newman Lake plot this spring shows an increase over former years. Almost all cankers of 1927 origin will fruit this spring.

R. inermis is in full leaf although the ground is still frozen a few inches below the surface in sheltered places. The scarcity of R. inermis is an indication of the efficiency of the eradication work done in 1929 by the permanent personnel of the Western Office.

Observations of the new crop of Pinus monticola seedlings found this year lead to conjecture as to the outcome of the race between blister rust and the regenerative powers of mature white pine, which so far shows no signs of infection.

(Editor's note: With the 23¹/₂ miles of R. inermis live stem pulled last spring the boys should be able to call the re-eradication this year done when they get 10 or 15 miles.)

RE-ERADICATION, CALIFORNIA, 1930

W. V. Benedict

The 1929 field season completed the fifth year of experimental Ribes eradication work in California. We have gained a fairly comprehensive idea of costs of eradication on different types in the optimum range of sugar pine and have developed methods of efficiently ridding the different sugar-pine types of their present Ribes population. Before a well rounded-out eradication program can be adopted, however, additional data are needed to complete the picture.

How permanent a job is the first eradication? Checking information (taken during the current eradication season) tells us we missed 20, 40 or 80 feet of Ribes live-stem per acre the first time over. We assume this is satisfactory protection. What is taking place on these worked areas two, three, four and five years after the first eradication job? How much crown sprouting is taking place and what is happening to the vast numbers of seedlings too small to locate at the time of the first working?

What effect does logging have on the timing of the first eradications and subsequent eradications if such are necessary? We have areas on the Stanislaus Forest from which the Ribes were removed just prior to logging, areas eradicated of Ribes just after logging and several years after logging. The lapse of time since logging has a profound influence on eradication costs. When, then is the most effective time to eradicate?

Ecology tells us there are dormant Ribes seed stored in the floor of the uncut forest and our experience with the prolific Ribes flora on old cutting areas bears this out. This undoubtedly calls for a second and

perhaps third removal of *Ribes* on some areas. To plan such work intelligently we must know how long a period is required for all stored seed to germinate, how rapidly seedlings grow (to reach a proper size for effective eradication) and just when these seedlings reach fruiting age.

Should several eradications be necessary to keep the sugar-pine forests in a sanitary condition with respect to blister rust, what is the cost of the subsequent eradications?

The answers to some of these questions fall within the province of *Ribes* ecology. However, many of them can be answered only by an intensive re-eradication of the present eradication areas. Should the two studies overlap on some points it will serve all the more conclusively to bear out the facts.

Intensive re-eradication studies are planned for this summer on the 1926 and 1927 eradication areas of the Stanislaus Forest, to get an answer to some of the foregoing questions.

The re-eradication project this season will consist of fifteen men and it is planned to systematically cover one-half of each block of the 1926 and 1927 eradicated areas.

FIGURE THIS OUT
M. C. Riley

Premature ripening of *Ribes* fruits, at least as far as color was concerned, within ten days after the bushes were sprayed with chemicals, was noticed during the 1929 field season at the *Clarkia* experimental plots. This apparent ripening was much more noticeable on *Ribes inerme* than on either *R. lacustre* or *R. petiolare*.

This condition was observed as early as the first week in July. The time of day spray was applied, pH value of spray, concentration of spray and presence of different hygroscopic agents, made no apparent difference in the ripening process.

No one seems to know at this time whether or not the seeds contained in the prematurely ripened fruits are viable, but if they are it is possible that seedlings might be produced during the current season and get a head start for the following year's growth. If the tests now in progress at the University of Idaho show that alternate high and low temperatures are necessary for germination, then of course these seeds could not germinate before the next spring at the earliest.

If the above mentioned tests show that such alternate high and low temperatures are not necessary for germination, then the question arises as to whether or not the leaf area of the current year seedlings would be large enough to be a factor as far as protection is concerned. It is

probable that such leaf area would be small in proportion to that of the missed or only partially killed bushes.

In any case regardless of whether these seedlings could or could not be a factor in the control program, it would be interesting to know if the seeds are viable or not.

SOME OBSERVATIONS ON BLISTER RUST IN THE PUGET SOUND REGION

Blister rust is enjoying a period of great growth and prosperity in the Puget Sound region of Washington. The observations of the editor on a recent trip to that section are the basis for that conclusion.

Of course the writer was not familiar with conditions there prior to this year and so cannot say just how much more prevalent the disease is this year than formerly. The striking condition observed was that rust was found every place white pine was found. The extremely large number of first symptoms observed and the abundant aecial production are the basis for the first statement.

A peculiar condition was observed in the Chico area near Bremerton. One small draw contained a large number of fine young pines ranging from seedlings to trees six or eight inches in diameter. These pines are of the open-grown variety and practically all of them had limbs clear to the ground. The greater percentage of the trees were infected. At least 95 per cent of the infected trees had trunk cankers close to the ground while only a very few of them had cankers on the branches. In most cases the branch cankers were of much more recent origin than those on the trunk. All of the trunk cankers had fruited several times whereas the branch cankers were mostly producing aecia for the first time. This particular area is within a short distance of Puget Sound and has a plentiful crop of R. sanguineum. No other Ribes were observed.

Another draw, just over a small ridge from the one mentioned above, is well stocked with young pines ranging up to ten or twelve feet high. R. divaricatum is very abundant the full length of the draw. At the lower end of this area approximately seventy-five choice fruiting cankers were cut from ten or fifteen trees within a circle of not more than 100 feet in diameter, yet up the draw from that small area very little rust was visible and Ribes and pine were growing close together. Some few cankers were found but widely scattered. Just what the reason is for the sharp line between heavy and very light infection is not known by this writer. It may be that the wind always blows down the canyon and if that is so it would readily explain the lack of infection above.

The now well-known Paschall's Ranch infection area is showing a goodly number of dead trees and those still living show lots of infection. The north facing slope where the original infection started is of course hit the hardest and there are very few live trees there. The trees on

the opposite slope are hit practically 100 per cent and many dead trees were observed.

In the pine grove of the Mountaineers' Club, about a half mile from the main infection center, cankers were found, but there is very little infection present in relation to the total number of trees.

Observations made while traveling toward the Canadian line showed infection on most all white pines seen. These were mostly cultivated trees growing in yards along the highway.

The other large infection area was about eight miles from Sumas, Washington in Columbia Valley. This particular area is on an old burn and neither Ribes nor moisture seems to be very abundant. It is in a wide valley between rather high mountains and no streams are within a mile of the center of infection. A few dead trees were seen scattered over the area but the greater majority of them are still living although heavily infected. Especially striking was the large number of first symptoms seen. Cankers fruiting for the first time were also plentiful.

ANALYSIS OF WESTERN WASHINGTON WAVES OF INFECTION

E. L. Joy

Heavy precipitation during the spring and fall is conducive to exceptional intensification and spread of white-pine blister rust and therefore gives rise to a wave of infection. 1927 and 1928 were both years of heavy precipitation which caused two successive years of intense activity of the disease. The effect of this two-year wave is now very pronounced, as is shown by recent observations in the coastal section of Washington.

During the first ten days of April two regions in northwestern Washington, where the disease is very abundant, were observed. One is the Puget Sound region as represented by the infections near Bremerton and the other is the northern Cascade region, the Columbia Valley area near Sumas, Washington being a part. Both of these regions have an abundance of young white pine which is heavily infected.

It must be remembered that the observations made during the spring of 1930 are approximately two and one-half and one and one-half years after the periods in 1927 and 1928 when the pines became infected. Also, the period of incubation in the needle and stem before discoloration shows is usually one and one-half years or more and the additional period before the cankers produce aecia is one year. Therefore, as expected, many young cankers of all stages were found from the first symptom or orange-colored spot at the base of the needle fascicle to the fully developed canker producing aecia for the first time. Because many of these cankers that will fruit for the first time this year had not fully developed, no accurate study could be made of

the per cent of all young cankers fruiting for the first time in 1930. However, indications are that this figure will be between 60 and 70 per cent.

From studies made in western Washington in the fall of 1929, it was determined that the ratio of cankers resulting from the 1927-28 wave to those originating before that time was forty-three to one. Should two-thirds of these produce aecia in 1930, and this year prove to be favorable for the development of the rust, the spread of the disease will be great. And, further, if 1931 is to be our next wave year, with two-thirds of the cankers producing aecia for the second time and approximately one-third for the first time, the invasion into new territory will be proportionately greater. In either event, we are assured of the worst wave of infection we have known.

RE-ERADICATE AT NEWMAN LAKE

Re-eradication was recently completed on the Newman Lake study plot when members of the office spent two days removing R. inerme from the infected area.

During the spring of 1929 some 23 $\frac{1}{2}$ miles of R. inerme live stem was pulled. This year but 825 feet of live stem was found and removed. Most of this consisted of new shoots from old stems broken off in the original operation. A very few bushes missed the first time over were found and only four or five seedlings were noted.

NOTES

D. W. Nelson and Fred Staat of the Western Office left April 11 for the Coeur d'Alene National Forest to work on the Insect Control spotting crew.

* * *

A blister rust demonstration was given by Kermit Miller before the rangers of the St. Joe National Forest at St. Maries, Idaho April 15.

* * *

Miss Marie V. Lynch joined the stenographic force of the Spokane office March 26.

* * *

Most of the members of the Spokane office attended the interim meeting of the Washington State Forestry Conference at Spokane April 16. S. N. Wyckoff presented a paper on the white-pine blister-rust situation.





W E S T E R N B L I S T E R R U S TN E W S L E T T E R

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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister-Rust Control
Spokane, Washington

CLEARING AND BURNING VS. HAND PULLING

C. H. Johnson

The question often arises in my mind as to whether we are getting anywhere by the method of hand-pulling Ribes along major drainages. To me the statement that so many thousand acres of white pine have been protected by removing the Ribes from a certain drainage has always seemed like a rather hollow statement and unworthy of a great deal of consideration.

Anyone who has ever grubbed or pulled Ribes, where such are heavily concentrated and intermingled with other species of brush, knows very well that new bushes will again appear and if sufficient time is permitted to elapse before the ground is retraced, very slight evidence of any previous work will be noticeable. At least very few jobs will be blister-rust proof enough to keep out the ever present and continual rain of spores. We cannot continue to follow the practice of jumping too hurriedly from one location to another, if so, we may find the area supposedly protected generally infected in a few years.

The whole blister-rust-protective program is comparable to a road building program. If all money were spent on new construction, as is often the case, and no balance between upkeep and new construction maintained, the net results would be a preponderance of poor roads. The one solution to rectify such a condition would be to build roads as the ancients built. Roads that would last forever.

In blister-rust-control work why not make each job so thorough that even a major disturbance such as fire could not change the order of things. If chemicals are employed to kill the Ribes and brush, burn the brush and debris afterward. Expose the hidden Ribes quickly. If it is desirable to hand pull a brushy area, grub the Ribes, cut and pile all brush and establish a turf which will result in fierce root competitions such as the undesirable species will be unable to withstand.

When Ribes eradication is conducted in this manner we shall have little need of employing checkers to determine efficiency or effectiveness of control. Any statement declaring that the eradication of Ribes along a drainage has protected the area drained will hold true as far as the Ribes along the stream would be a contributing factor.

COMMENT

The thoughts expressed by Johnson in the preceding article most decidedly merit our careful attention to the conditions which he discusses. Eradication of Ribes petiolare and R. inerme by hand pulling methods always

has been, and probably always will be, an expensive and very unsatisfactory procedure. It is my feeling, however, that this method is only a temporary one. We now have chemicals which will kill R. petiolare, and where this species occurs alone it can be eradicated in a satisfactory way by chemical means. There is no reason to believe that we shall not finally secure chemicals which will be equally effective upon all species of Ribes and that the eradication of R. inerme and R. lacustre will then present no greater difficulties than R. petiolare.

Johnson is supervising the largest Ribes eradication operation we have yet attempted in which R. inerme constitutes one of the major difficulties. Despite the large amount of excellent work done at the Savenac Nursery, eradication of R. inerme is still far from complete because of the resistance of this species to any chemicals which we now have and to hand pulling methods. It should also be remembered that Ribes eradication around a nursery must finally represent a hundred per cent job. The work now being undertaken at Haugan, which consists of complete eradication of the brush cover where Ribes occur, followed by the attempt to induce the formation of grass turf, is one of the most constructive and interesting pieces of work now under way by this office. It is, of course, problematical if such an intensive method of work could ever be applied except around nurseries, although the possibility of its more general application should not be entirely disregarded. When the expense of such work is considered its good points must also be put into the scales. Well-formed turf is a successful and permanent deterrent to new Ribes growth. Also brush land is useless land while grass land has economic value for forage.

The working method which Johnson is using at Haugan will result in a high initial cost with a low maintenance cost. Over a period of many years the net expenditure may at least equal that under other methods or may possibly favor this type of thorough eradication. S. N. W.

(Editor's note: The preceding two articles bring to the News Letter a question which has been discussed by eradication men for some time. Johnson has used fire at Haugan to eradicate almost impenetrable concentrations of brush where R. inerme thrives. The fire method has eliminated the majority of the Ribes, as well as the brush, making the eradication of the few remaining bushes comparatively easy. Further treatment of this question will be welcomed by this publication.)

OUR FIRE RECORD

B. A. Anderson

There is one record of which the field men of the Office of Blister-Rust Control are especially proud. During the nine years that this office has had camps in the forests of Idaho, not a single damaging

fire has been started by blister rust men. The permanent men attached to this organization are thoroughly "fire conscious". They are familiar with fire fighting and realize the dangers of carelessness. Long hours of back-breaking labor at the business end of a grub hoe, choking smoke, smarting burns, and the constant danger of being crushed by falling trees have helped to impress on their minds that it never pays to fool with the Red Demon of the woods.

At the beginning of each field season the supervisor of the various projects have called to the attention of the men in their charge the necessity of always being extremely careful with fire. It perhaps is unnecessary to state that absolutely no smoking is tolerated outside of the camps during the fire season. So far it has not been found necessary to discharge a man for violating that rule.

It has always been the policy of the office to cooperate whole-heartedly with the Forest Service and the timber protective agencies in suppressing fires. Time and again blister-rust camps have closed down operations and the men placed on the fire line until the fires have been brought under control. This policy at times has interfered seriously with the blister-rust-control program but of what use is blister-rust control in a barren waste of charred stumps?

Three out of the last five field seasons have been bad fire years in the regions where blister-rust control has been carried on. In 1925, a total of 1,189 man days were spent on fire control by blister-rust workers; in 1926, 2,599.5 man days were spent fighting fire - more than 53% of our entire field season. 1927 and 1928 were good fire years, only 21.5 and 45 man days, respectively, being put in on fires. 1929 was a bad fire year in north Idaho but most of the fires were at a considerable distance from the operations of our camps. However, fire time totaled 386.5 man days.

This spring has been hot and dry and all indications point to a bad fire year. It is a condition which should train us to be on our guard and to take every precaution to prevent any blaze from attaining serious proportions. Warn your men to keep a lookout for smokes and instruct them in what to do in case of fire. Let's work on blister-rust control instead of on fire in 1930.

1930 OREGON PROGRAM
L. N. Goodding

The blister-rust work in Oregon for this season is chiefly a continuation of last year's program. Six men will conclude the eradication work in the Still Creek planting. This will consist of

making a solid unit or block of the eradicated area by completing the stream-type eradication south of Still Creek and a small creek entering Still Creek from the north, about one-half mile above the old planting cabin. The entire area will also be worked by scouts to catch missed bushes in the portions already worked and to complete the eradication on the slopes south of Still Creek. No attempt will be made to save the pines below Veda Lake as this would constitute a very expensive undertaking.

At the Wind River Nursery in Washington, a six man crew will complete the eradication of Ribes bracteosum on the heads of Martha Creek even beyond the mile zone, to prevent the constant seeding in along the stream below. The stream type along Trout Creek will be checked to the limit of the mile zone. No attempt will be made to follow farther up this stream, as it and its tributaries represent miles of stream type.

Professor Sipe will continue his ecological studies in Oregon, laying particular stress on some of the species occurring in association with sugar pine, such as R. klamathense, R. cruentum, R. velutinum, R. binominatum, R. marshallii and R. erythrocarpum.

We hope also to transplant a goodly number of bushes of these species to a region where pines are infected to enable us to get a general idea of their susceptibility.

More extensive and intensive scouting for the disease will be done in northeastern Oregon and in southwestern Oregon.

We have a pretentious program laid out for educational work, including circularizing the Forest Service, state forestry organizations and other groups, and in placing exhibits at county and state fairs.

BLISTER RUST IN RAINIER PARK

One of the heaviest infections of blister rust ever found in the West was discovered May 3 in Rainier National Park, three and a half miles up the West Side Highway from the Nisqually entrance by C. C. Strong, L. N. Goodding and M. C. Riley.

The infection is in a wide valley and extends up the side to and above the highway. Later S. N. Wyckoff, E. L. Joy and Goodding visited the area. So far no attempt has been made to scout out the limits of the infection but the brief examination by the two groups mentioned revealed that practically all of the trees on the area were infected and most of them were "flagged".

"It was impossible to count the cankers on some of the trees as entire limbs would be a solid mass of cankers", said Strong.

"Many of the cankers are fruiting for the first time but a large number have fruited at least twice. Infection is not confined to the branches, as many large trunk cankers were seen."

Three species of Ribes are in association with the infected trees, R. laxiflorum, R. bracteosum and R. lacustre.

The infected area is about five miles by air line from the closest valuable white pine. The nearest area is near Longmire Springs and eradication work will be done there this season to save the trees from blister rust.

DEMONSTRATION AT SPORTMEN'S FAIR

A white-pine blister-rust demonstration was given at the annual Sportmen's and Tourists' Fair at Spokane during the week starting May 12.

A lantern slide series, run for the first time on an automatic projector, served admirably to attract the crowds to the booth and many people stayed to watch the entire series. Specimens of blister rust in all stages also came in for much attention, as did two wild Ribes bushes.

A half day was spent by two men securing six excellent specimens of western white pine to be used in decorating the booth. Monday morning it was discovered that someone else also had had use for such trees and had stolen all of them. Through the generosity of K. D. Swan of the Forest Service, one lone tree was secured and it had to carry the decorative burden all alone.

More and more people know about blister rust, judging from conversations around the booth, although some people still refer to the rust as "those bugs".

The present demonstration answers all questions through the slide series and is much more effective than having one or two men on duty all the time for that purpose.

HISTOLOGY SPEAKS

H. R. Offord

Chemical investigation work is about to raise up its histological arm to ward off the threatened blow of our new Editor who promised dire punishment should Berkeley fail to produce material for his new and shining press. Here she is, Mr. Editor, a small voice crying from a wilderness of palisade cells, stomata, and tracheal elements; and let

me tell you, sir, that you are favored in receiving it because aside from the data furnished by (Mrs.) I. E. Webber there are included the sort of speculations that are usually written by candle light, read in secret behind closed doors and then filed away as a matter of personal record.

For the sake of brevity a few of the salient points which have been the subject of histological studies for R. petiolare, R. viscosissimum, R. lacustre and R. inerme will be listed in tabular form. These data refer specifically to R. petiolare. It also should be kept in mind that the magnitude of these data for the other three species places them in the above order in regard to susceptibility to chemical sprays.

Histological Fact	Physiological Significance
1. Large palisade ratio (Webber) (length of palisade cells to thickness of leaf).	Photosynthesis rapid and photosynthetic potential high.
2. Large and more numerous tracheal elements. (Webber)	Large capacity for intake of water and soil solutes.
3. Rapid growth.	Minimum of stored carbohydrates.
4. Large number of stomata. (Patty)	Rapid intake of CO ₂ necessary to photosynthesis and rapid removal of end products.
5. Diameter of petiole where it joins the leaf is large and forms a complete ring.	Ready movement of water and solutes.

It is evident from these data that R. petiolare is a plant in which metabolic processes are operating at a high rate of speed. If the "metabolic potential", if it may be so described, is the criterion of a plant's susceptibility to the physiological type of poison which sodium chlorate appears to be, the importance of finding a convenient measuring stick for our "metabolic potential" is readily seen. A point worthy of note in this connection is R. petiolare's resistance to the rapidly toxic or caustic type of chemical. Sodium hydroxide, sulphuric acid, copper sulphate and mercuric chloride are about as ineffective on R. petiolate as they are on R. lacustre and R. inerme. The moment we apply a chemical which exerts more than a local superficial action (other than heavy metal complexes which have been specifically designed for a

particular species) a marked difference is noted in response.

While it is still early in the game the writer is willing to wager that low starch content, and low tannin content will be correlated with high palisade ratio, large and numerous tracheal elements and a large number of stomata, and furthermore, that within one genus these data will determine the susceptibility to certain chemicals. Perhaps one histological factor, for the sake of argument, the palisade ratio, is the master key. At any rate the histological and chemical data for R. bracteosum, which turned out to be much more resistant than R. petiolare to sodium chlorate in spite of its apparent similarity, will be worth watching. Place your bets early.

NOTES

Excerpt from Application Blank.

Present position: Going to school.
Kind of work: Hard work for teachers.
Salary: Good education.
Employer: Various teachers.
Address: Ritzville High School.
Date you began work: 12 years ago.

* * *

The editor hereby tenders an apology to M. C. Riley and family for omitting to mention in the April News Letter the birth of a daughter, Helen Elizabeth, March 24.

* * *

H. R. Offord arrived in Spokane May 12 from Berkeley after a memorable experience with high speeds, tail winds and burned-out bearings. Tail winds and air cooled motors are a poor team, says Harold.





June 15, 1930

110.6

WESTERN BLISTER RUST

NEWS LETTER

* * *
Confidential
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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister-Rust Control
Spokane, Washington

A CHECK OF THE 1929 ERADICATION ON DEER CREEK

E. L. Joy

In the latter part of May, Myers, Chapman, and the writer rechecked the eradication check plots on Deer Creek, a tributary of the South Fork of Reed's Creek in the Clearwater Timber Protective Association to determine the amount of *Ribes* live stem eleven months following the initial eradication. Data were taken on these plots in 1929 before eradication and approximately two months after completion of the work on this stream. Therefore, we have three sets of comparable data from which to compute the efficiency of this work.

One plot, covering one-eighth mile of stream type, which was established to determine the effectiveness of a "one-time-over" eradication, was rechecked. Seven plots, spaced at twenty chain intervals, each 13.2 feet wide and extending across the stream type, were rechecked to ascertain the results of the regular "two-time-over" work which consisted of the initial spraying followed a month or two later by a cleanup of missed stems, or bushes.

Before eradication in 1929, the one-eighth mile plot had a total of 9,905 square feet of area on which *Ribes petiolare* was growing with an estimated average of 10 feet of live stem per square foot. The fall check showed a total of 3,957 feet of live stem on this area or 0.4 foot of live stem per square foot. In nearly all cases the surviving live stem was growing in the water and showed evidence of having been under water at the time spraying was done.

In May, 1930, this plot had a total of 422.5 feet of live stem or .04 foot per square foot of area originally covered by *Ribes*. Again most of the live stem occurred in the water.

From these data, we find that 3.99 per cent of the original *Ribes* live stem was alive in the fall but only 0.42 per cent the following spring. Therefore, the spring check shows that 99.58 per cent of the original live stem was killed.

The seven plots, used as a check of the regular twice-over eradication, originally had a total of 20,635 feet of live stem on 2,277.5 square feet of *Ribes* area or 9.07 feet per square foot. Two months after eradication the check showed 76.2 feet of live stem or 0.03 foot per square foot.

The results of the spring check show 191.5 feet of live stem or 0.08 foot per square foot. The per cent kill, therefore shows a slight decrease, dropping from 99.63 to 99.08. This is probably

due to inaccurate data, taken in the fall when leafless but not lifeless stems were recorded as dead.

Although these figures are based on data taken from only a few plots, it is the writer's opinion that they are quite representative of the results obtained from the 1929 eradication work in the Reed's Creek drainage. Observations were made on work in other drainages of this region disclosing some missed or partially killed patches but in general showing very good results.

The difficulty of eradicating R. petiolare covered by water in the spring seems to have been overcome by the method used, namely, the re-covering of each area and spraying of missed bushes when the water is low. Another problem which has been discussed but not settled, is that of determining which year, following the initial work, should re-eradication or re-covering an area be done in order to remove missed bushes, sprouts and seedlings. From observations made on this trip, it appears that the spraying of these tag ends the year following the initial work would be a wise and profitable step toward 100 per cent eradication and absolute protection.

RECONNAISSANCE ON ELDORADO FOREST

D. R. Miller, with a six-man crew, will open camp about June 16 in the Eldorado National Forest in California and reconnaissance work will be conducted until about September 16.

No effort will be made to work the entire forest but it is expected that the best sugar pine areas will have been covered by the time the field season is over.

California reconnaissance data is so taken as to be readily convertible into pre-eradication dope and the work this season should give the eradication men all information on Ribes on the Eldorado.

COMMENT.

CLEARING AND BURNING VS. HAND PULLING

G. A. Root

The article under the above title by Johnson in the May News Letter has opened up a field for argument. The sudden promulgation of a new idea, somewhat foreign to the general trend of blister-rust control measures, is naturally looked upon with some skepticism. Yet it is only with the promotion of such ideas that progress is made. The thought of clearing and burning has probably entered the minds of other eradication men at various times. The seemingly excessive cost which this would entail as applied to the general

program, together with the marked adverse attitude toward burning in forested areas, has undoubtedly kept these thoughts submerged.

It can be frankly stated that the thought of eradicating Ribes by the application of toxic chemicals was looked upon with skepticism when first suggested. It must be conceded that the results of this method have put it beyond the experimental stage and it takes its place as one of the successful methods of Ribes eradication. So much for the brighter aspect of the situation relative to new ideas.

The largest single factor in the control or eradication of an insect pest or plant disease is the cost. It cannot be disputed but that if enough money is thrown into the fray, the desired results can be accomplished. There is a point, however, where the value of the commodity may not warrant complete eradication of its enemy; where the financial burden involved would so disrupt the orderly progression of the business affected, as to make the situation worse than the inroads of the pest itself. This of course is especially true where the pest is widespread. In the first case, it would hardly pay to secure eradication of a number of bark beetles, major pests of several important timber trees; in the second, it would hardly pay to eradicate the Japanese beetle--too many industries would be seriously disturbed in accomplishing this.

Where the health of the public is concerned or the life of an industry seriously threatened, then only can enough money be warranted to eradicate a pest. One has only to mention the Foot and Mouth Disease and the Mediterranean Fruit Fly to get my thought.

Blister rust, it must be admitted, does not fall in the above category. The production of white pine has been going on in spite of the presence of blister rust and will continue to do so for some time to come in spite of increased inroads. The writer believes explicitly in reasonable control measures, but to put into action the cutting and burning of brush along white pine drainages so as to "make each job so thorough that even a major disturbance such as fire could not change the order of things" is a bit chimerical.

It is too early, if I am correctly informed, to know one way or the other whether the white pine within a drainage has been afforded reasonable protection. I doubt if any one believes in absolute protection. Yet there must be some practical basis for the assertion, besides other obvious reasons, or else we are walking on dangerously thin ice.

Blister rust is now too widespread to adopt methods whereby a 100% "clean up" can be guaranteed, except in very small areas. In other words, would it be prudent "to build roads as the ancients

built"? (I rather surmise that if this had been the case with Idaho roads, one would still be miles from infection and working centers.) It has seemed more logical to build roads of reasonable stability, allowing more mileage to be completed even if they require what appears to be considerable upkeep--it has seemed more logical to pursue this policy with blister-rust control measures. A thing of stability and permanence we all admire, one in which we should like to aspire to in various endeavors, but it just "can't be did" in this modern age of widespread activities where certain sums are set aside to take care of projects of enormous scope.

There is a place for the idea put forth by "Hiram" in the sanitation of nurseries as mentioned by S. N. W. This idea can be easily carried out in an area near a nursery in California. Part of the brush is already cut, the edge of the patch is in sod and here will be an excellent place to watch its encroachment into the burned area. There is the possible chance to use tractors in uprooting or pulling out brush. These implements have been used to make fire lanes in some of the California forests and it is surprising what heavy brush is destroyed by them. The use of them would undoubtedly increase the scope of the method of clearing and burning.

The general trend of opinion of those who presume to know, is that the public must accommodate and content itself to live with pests. The question is to what degree can these pests be so numerous or their devastation so acute as to cause serious economic loss?

CHEMICAL ERADICATION IN CALIFORNIA

Rene d'Urbal

Chemical eradication in California is a difficult problem. The species encountered, Ribes nevadense, R. roezli, and R. inerme, are very resistant. The weather during the spraying period is very unfavorably drying. R. roezli, the species that, because of its wide distribution and great numbers requires especial attention, is generally far removed from water and extremely resistant to fire, drought, hand-grubbing and chemical eradication. I understand from Benedict that R. roezli resprouts are a real difficulty in the hand eradication of this species.

Chemical tests on a plot scale have been conducted in California since 1927. Straight chlorate, mixtures of chlorate and other chemicals have been applied in 1928. The copper sprays "X" and "Y" were applied in 1929 at Gooseberry Camp (elevation 7,000) and at Leland Meadow, and also in the Plumas, on R. inerme, than

which there are no more magnificent bushes in Idaho. A careful check of the effectiveness of these early trials in the direction of complex metallic sprays will be made later in the season. Early observations show considerable damage to the aerial portions.

The 1927 applications of chlorate on R. nevadense, R. roezli, and R. cereum showed the ineffectiveness of straight neutral chlorate. Most of the bushes showed slight suckering in 1928, vigorous growth in 1929, and by 1930 they have attained three quarters of their original stature. Mixed chlorate sprays applied in 1928 showed some promise.

The California work for 1930 will extend the usual intensive plot applications of new sprays. These include chlorate sprays, work with oils and dusting of Atlacide together with some further work with copper sprays.

Benedict and I are selecting R. roezli areas for work with oil on a semi-large scale. One of the worst problems in the hand eradication of R. roezli is the sprouting of crowns and roots which have been incompletely removed. A heavy application of oil on such obdurate survivals might make the eradication job easier and more satisfactory. In light concentrations, one man equipped with a small tank of oil might well take care of this. Oil will also be applied on heavier concentrations of R. roezli on undisturbed bushes, on slashed bushes, and on bushes cut well down to the crown. One of these procedures or a modification, may prove a satisfactory method of eradication.

Collections of R. nevadense and R. roezli are being made for subsequent histological and chemical analysis. Perhaps under pressure of the laboratory third degree the tough Ribes will tell us all! Clarence Quick, one of our Berkeley histologists, is working with me at these collections and will make field observations of interest on the starch of the California species. On my way to Oregon I shall have a chance to see what happened to a few of Benedict's mammoth Meadow Valley R. inerme which were sprayed last year.

MONTANA TAKES ANOTHER STEP

C. H. Johnson

The first eradication job in Montana on other than Federal lands will get under way June 16 when a crew of four or five men start protection work on private, state and Federal lands near Echo Lake in the vicinity of Kalispell.

The Ribes in that region consist chiefly of Ribes lacustre and R. viscosissimum, but R. inerme is abundant where the stream type opens to marsh lands. It is doubtful if R. inerme will be encountered this summer.

CHEMICAL WORK IN OREGON

Rene d'Urbal

Preliminary chemical experimentation on the species Ribes bracteosum, R. sanguineum, R. lacustre, R. triste and R. watsonianum was carried out in 1928 and 1929 in cooperation with L. N. Goodding and members of the Oregon squad. Chlorate alone and in mixtures and also X and Y sprays have been tried out.

R. bracteosum proved to be quite resistant to sodium chlorate, considerable suckering from the crown being noted. On the other hand, several patches of R. lacustre near Veda Lake were completely wiped out by caustic (2%) solution of sodium chlorate 15%.

This summer's checking will tell us how effective the X and Y applications were. New formulae, of course, will be tried and the work extended to include R. klamathense.

As in California, complete histological and chemical collections are to be made. Mr. Sipe will make collections in the Crater Lake district and Mr. Holaday in the vicinity of Still Creek.

* * * * *

* ADDRESSES *

* At this time of the year, when all of the *
men are very busy with their field work, it seems *
particularly difficult to get them to keep the Spokane *
Office informed of their addresses. Since this *
means that we may not have a definite address for *
mailing out checks, as well as mail which may come *
to the office, it is to everyone's advantage to keep *
the office closely informed of mailing addresses. *

* It should be the responsibility of each *
project leader to inform the Spokane Office of the *
names and addresses of all of the men under his *
supervision. In cases where the men will be traveling *
from place to place the project leader should in- *
struct them to send in their addresses. In several *
instances we do not now have the addresses of some of *
our permanent men or the men who are working under *
their supervision. *

* * * * *

CALIFORNIA RE-ERADICATION

W. V. Benedict

The 1930 California re-eradication program calls for the re-working of portions of the 1926 and 1927 areas in the Stanislaus National Forest.

A 17-man camp is located on the South Fork of the Stanislaus River, one-quarter mile below Strawberry. With the assistance of the 1-1/2 ton truck this site should serve throughout the season, making a camp move unnecessary. Camp opened June 10 and will close approximately September 10. T. H. Harris is in charge of the camp.

Present plans call for working one-half of each eradication block on the 1926 and 1927 areas, except a few blocks which have no well-defined boundaries on which no work will be done. Blocks will be re-worked at right angles to contours, to provide, as nearly as possible, representative Ribes and working conditions.

The sixteen crewmen have been organized into four three-man crews and four recorders. Three of the crews will be engaged entirely on re-eradication, to cover the ground as rapidly and efficiently as possible for the purpose of ascertaining the cost of the second eradication. Behind each of the crews will be a special recorder. His job will be to act as crew foreman as well as record all Ribes data called for on the two special forms designed for this study.

The summarized results of these data should prove valuable in providing definite information on such questions as:

1. What volume of sprouting takes place on the different sites following the original eradication?
2. How important is the seedling problem on the different sites?
3. When do bushes first fruit?
4. How rapidly do seedlings and sprouts grow?
5. How long before all stand seeds have germinated?
6. When is the proper time for subsequent eradications if and where subsequent eradications are necessary?
7. What is the influence of logging on re-eradication work?

Each re-worked block will be systematically checked by Harris and one assistant.

The remaining three men, working with the writer, will be wholly engaged on such special experiments as merit undertaking. The first of these experiments will be the relatively large-scale application of Diesel and pitch oil to Ribes, in cooperation with d'Urbal. This experiment will be divided into three parts: (1) the application

of oils to the exposed Ribes crowns, (2) to the Ribes stems after they have been lacerated and (3) sprayed on the leaves and stems.

It is also planned to conduct other spraying experiments, especially the chemical destruction of Ribes seedlings where they occur in profusion. If a duster is developed early enough it will be given a trial on California Ribes.

PROTECT MT. RAINIER PINES

A sixteen-man hand eradication crew under the supervision of M. C. Riley will start work June 16 in Mt. Rainier National Park removing Ribes from the four principal white pine areas in the Park.

C. C. Strong and Phil Simcoe conducted a pre-eradication survey of these areas in the fall of 1928. While none of the pine is of commercial value, it does have a high aesthetic value and for that reason the Department of the Interior is furnishing funds to save the Rainier pines. The Office of Blister-Rust Control will furnish the technical supervision.

No chemical work will be done on any of the park areas, although several Ribes concentrations would warrant their use. The job will be primarily in stream type although some upland will have to be covered.

The principal Ribes species to be eradicated are Ribes bracteosum, R. lacustre, R. laxiflorum, R. sanguineum, R. divaricatum and R. viscosissimum. There may also be some R. triste present although none was seen during the pre-eradication work.

The acreage by types to be worked is as follows: 67 acres of Class B, 109 acres of Class C, 306 acres of Class D, 1 acre of Class L and 11 acres of Class M. In addition to the above there is a considerable area which will have to be scouted out.

BOOMING ALONG AT HAUGAN

C. H. Johnson

Brush clearing along streams in the vicinity of Savenac Nursery at Haugan, Montana, was started by a three-man crew on May 2. On May 19 the force was increased to 28 men and it is planned to maintain an average crew of 24 men until July 1.

Those who are familiar with the brush conditions at Haugan know why this work is necessary. The eradication crews will

have a far easier job of hand-pulling after the brush disposal gang has cleared the almost impenetrable thickets.

About June 15 two hand eradication crews will be added to work the entire stream type area within a mile radius of the nursery. Beginning July 1 the eradication force will be pruned to 12 men and the lineup will consist of one four and one five-man Ribes pulling crew and one three-man brush disposal crew. Before the eradication season draws to a close it is estimated that the entire area will have been covered and all hands will be busy cutting, piling and burning brush.

Present plans call for making the Savenac area a Ribes-free area. A good start has already been made. Ribes petiolare, which originally comprised about 30% of the Ribes population, is practically non-existent, thanks to the effectiveness of NaClO_3 .

In 1929, fire was allowed to whip through the dense brush areas. By this method, millions of Ribes seeds were destroyed and millions of feet of live stem of R. inerme and various species of brush no longer retard the progress of eradication crews.

The final report in 1929 gave fire credit for eradicating approximately 40 acres in the stream type. Observations this spring were so encouraging and convincing that an additional 40 acres has been thrown into the fire column.

The use of fire as an eradicated agent has not upset any existing theories as to the germination of Ribes following fire. A selected 1/20 acre plot covered with a heavy mantle of duff and subjected to only a moderate burning revealed a surprisingly heavy germination of seedlings. Two counts indicated the presence of 13 and 16 R. inerme seedlings per square inch. This particular and very select area was planted with a mixture of timothy and clover April 16 and an extremely heavy stand of grass was obtained. It will be interesting to learn whether the grasses, the Ribes or a combination of both will survive.

Brush clearing in the St. Regis and Big Creek drainages is being confined to those areas supporting heavy concentrations of R. inerme while the area being worked on Savenac Creek is one of very dense brush from which approximately 95% of the Ribes have already been removed.

About the middle of June, 10 brush men and 8 hand pullers will concentrate on the last heavy concentration of R. inerme, located 1½ miles up Savenac Creek. By July 1 the virgin stand of Ribes will

be disposed of and all attention will be centered on missed bushes and resprouts over the $8\frac{3}{4}$ miles of stream type in the protective zone.

The entire area with its burned and cleared area is beginning to take on the appearance of a golf course. It is anticipated that grass will gradually replace the brush and the area will then be available for grazing.

CALIFORNIA PROGRAM FOR 1930

G. A. Root

Black Current Eradication: The year of 1930 calls for the completion of this project. All but five counties have been covered, these being in the southern part of the state. Over the greater part of these, the climate is not conducive to the growing of small bush fruits, much less Ribes nigrum. Some white-bark pine and sugar pine occur at the higher elevations. The work will be carried on by the writer in conjunction with the agricultural commissioners of the respective counties.

Scouting: Pine scouting will be done this summer in the northern part of the State in Del Norte and Siskiyou counties, bordering the Oregon line. In conjunction with this, plans will be formulated for an intensive Ribes scout in this same area in late summer or early fall. It is hoped that a crew of five or six men will be available to carry on this work for a period of several weeks. Needless to say, a sharp lookout will be kept for signs of the rust in other parts of the State, especially in the sugar pine range of commercial timber.

Nursery Sanitation: Preliminary work has already been done on a Ribes survey around the Eddy Tree Breeding Station. With the help of one or more of the eradication men, the project will be completed so that the office will be able to give an estimate of the cost to eradicate within the 1500 foot zone. This is a private institution and the cost must logically be borne by the owner.

During the course of the year, the conditions surrounding nurseries of several lumber companies will be investigated as well as those of the Forest Service. It may be that although no pines are shipped out of the State, protection will be desired.

Educational Work: It is planned to have demonstrations at several of the county fairs as in former years. A fair is being held by Del Norte County, at which a demonstration will be of considerable importance because of the proximity of the rust to that county.

University sets for educational work have been distributed to five institutions and before the end of the year the remaining ten will be sent.

WHERE THEY ARE WORKING IN IDAHO

Eradication work is being carried on in Idaho on four fronts with a total of 240 laborers waging war on Ribes under the guiding hand of C. C. Strong.

Fred Staat is in charge of the experimental application camp at Clarkia and has eight men to test out the new sprays developed by Offord and his co-workers.

W. G. Guernsey is again in charge of work on the Potlatch Timber Protective Association and has four camps of 18 men each. Neal Nelson is in charge of the Cameron Creek camp near Elk River; Ed Lundberg is bossing the Swamp Creek camp; Hartman is in charge of the camp at the mouth of Floodwood Creek, and Roy Lundberg is running the job near Lew Boehl's place.

B. A. Anderson is supervising the work on the Clearwater Timber Protective Association and has four camps of 17 men each. One is located on Calhoun Creek, one at Casey Meadows, one on the North Fork of Reed's Creek and one on Parallel Creek. Onstat, Crossley, White and Heinrich are the camp bosses.

H. E. Swanson has charge of the methods work and the work on the Clearwater National Forest and has four camps with 23 men in each. Ed Becher is in charge of the methods crew, Moss has the camp on Mud Creek, Frank Walters is bossing the El Dorado Creek crew and Thaanum is in charge at Cedar Creek.

BLISTER-RUST SEASONAL COMPARISONS

The year 1930 has set a record for early production on the Pacific Coast of aecia as far as can be determined from available data. March 16, at Paschall's Ranch near Bremerton, Wash., the first blisters were observed. This date wins by a nose over 1928 when March 19 was the opening day. In 1929 the first appearance of the pustules was noted on April 7.

The News Letter is indebted to Mr. S. E. Paschall for this information as the center of the infected area is on his ranch and he has always advised the Blister-Rust Office as soon as the rust has shown signs of coming to life.

In keeping with the early production of aecia, it would be expected that uredinia would also be earlier this year and that is true. The first observed was on May 6 at Paschall's Ranch. In 1928

the first uredinia were noted on May 11 while in 1929 they did not appear until May 22.

There is no record for the first production of telia in 1928 but the first were seen June 7 in 1929, with pycnia in evidence June 19.

It is interesting to speculate on the approximate date uredinia would have appeared this year had Ribes leafed out earlier. As late as April 8 the writer visited the Paschall's ranch area and at that time no leaves were visible on Ribes of any kind and aecia had been in the air then for at least three weeks. Many of the pustules were emptied of their spores by that time and but very few unopened blisters were seen.

Telial production in 1930, however, has not kept pace with aecia and uredinia. 1930 aecia were out 22 days ahead of 1929. 1930 uredinia were 16 days ahead of 1929 and five days ahead of 1928. In 1929 telia were in evidence on June 7 but the 1930 first showing was not observed until June 17. Cold, rainy weather slowed down development this spring. Pycnia were also observed June 17 at Paschall's ranch.

CALIFORNIA ECOLOGY

Frank A. Patty

The ecology project is now in the beginning of its third year in California. Heretofore all of the studies have been confined to the Stanislaus National Forest but this year they have been extended to include the Sierra and Eldorado National Forests. The former is south of the Stanislaus and the latter one is north of it.

Studies will be conducted this year (1) to determine the factors which govern the growth and distribution of Ribes bushes and (2) the factors which control seed dissemination and germination. Special emphasis will be placed on Ribes succession due to artificial and natural disturbances which occur in the stands of sugar pine. In the course of the previous two years' work, a number of permanent and semi-permanent plots were established. These will be rechecked at intervals during the summer.

The personnel will be made up entirely of a group of veteran Blister-Rust men. Richard Lillard and Ed. Wilde are hold-overs from last year's work. This is Lillard's fifth year with the office in California. Royale Pierson and Lincoln Ellison have both seen Blister-Rust service in the Pacific Northwest. Camp will be opened about June 21 and work will continue for approximately three months.

NOTES

* * *

C. O. Peterson resigned from the office May 31 to go into other work, taking with him the best wishes of all members of the office for success in his new venture.

* * *

MAYBE HE MEANS AT RIGHT ANGLES

Says Benedict, "--in re-eradication work the blocks will all be worked perpendicular to contours--." (How many airplanes will you use, Benny?)

* * * * *

* BEGGING AGAIN *

* Ye editor takes this opportunity to ask all
* readers to make every effort to get a large volume of
* News Letter material into the office not later than
* July 12. *

* On July 15 the first of the summer publica-
* tions will go to press (or more correctly, go to
* mimeograph). To make the News Letter as readable as
* possible, it is desirable that a large volume of
* material be on hand early. Camp doings of a more
* or less serious nature will be acceptable and any
* other material at hand will be welcome.
* Please keep the poetry at a minimum. *

* * * * *





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W E S T E R N B L I S T E R R U S T

N E W S L E T T E R

* * *
Summer Issue No. 1
* * *

U.S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister-Rust Control
Spokane, Washington

THE WESTERN PROGRAM

S. N. Wyckoff

In July, 1923, a small group of men arrived in Spokane to begin the job of controlling white pine blister rust in the Inland Empire. During the previous year the Western Branch Office of Blister Rust Control had been located in Seattle and the work had consisted of a general survey of the western field, largely to determine the actual extent of newly found infections. When field work was started in north Idaho very little was known about the problem except to realize that it was a large one. The species of Ribes occurring in this region were known, for the most part, through botanical records. There was no information extant, however, which would give us any idea of the exact types or locations of the various species and the extent to which they would be found in one locality or another. About all that was actually known was that in the white pine forests Ribes occurred in great numbers and that it was going to be a tough job to learn how to find and remove them. Since that time a great amount of very real information concerning the distribution and life habits of the Ribes has been secured, and working methods have been developed for their removal. The western organization has grown to many times its size in 1923.

We now have as a result of these past experiments, workable methods for Ribes eradication. But they are not perfect, and can undoubtedly be improved. For that reason our entire program is quite sharply divided into practical control work and the continuation of our experimental projects. Our operations on the lands of the Potlatch and Clearwater Timber Protective Associations; at the Savenac Nursery, Haugan, Montana; that under way by the Forest Service on the Clearwater National Forest and by the National Park Service at Rainier National Park, consist of practical control according to the best known working methods. At the same time other work is going on which is designed to improve methods now being used in order that they may be less costly and effective over a wider range of conditions. At Santa, Idaho, technical research is being carried on by Offord and his assistants in the physiology of Ribes plants and the resultant reaction under the application of chemicals. At Clarkia, Idaho, under the supervision of Staat, new sprays and new concentrations of old sprays are being tested for their killing efficiency. And in the Musselshell District, Swanson is constantly experimenting to secure new and better methods of both hand pulling and application of chemicals. Along this same line Breakey is working to improve the equipment being used in chemical eradication.

In Oregon and California the Ribes eradication work of this office is entirely of an experimental nature. Work this year in Oregon consists of the continuation of the experimental Ribes eradication on an area in the Mt. Hood National Forest which was planted to white pine a number of years ago by the Forest Service. The purpose of this work is to determine costs and methods for protecting white pine as it grows in Oregon. In California several years have been spent in experimental Ribes eradication on the Stanislaus and Plumas National Forests. This year the work consists of experimental re-

eradication on the Stanislaus Forest to determine how effective the previous work has been.

While these operations of a more practical nature, and experiments to better them are going on, other more technical investigations are also under way. Studies in Ribes ecology are being made by Rockie in Idaho and Patty in California, which will complete the general picture of Ribes growth in the white and sugar pine forests upon which the control program must be based. At the same time the men of Putnam's project are studying each pine infection area as rapidly as found to determine the amount of Ribes which caused infection. They also study the areas where eradication has been done to determine the effectiveness of that work in its final purpose of preventing pine infection. At the same time more technical studies are being carried on in British Columbia by the Office of Forest Pathology of the Bureau of Plant Industry determining the exact relative susceptibility of various Ribes species and any other factors of major interest to the control program.

From this brief account you will see that the western blister rust control program is complex in nature. It is necessarily founded upon experimental work which must be continued for many years in order to achieve the highest possible refinement of working methods.

THE LARGEST KNOWN PINE INFECTION CENTER IN IDAHO

H. N. Putnam

The heaviest pine infection center known in the Idaho white pine belt was recently discovered at the Long Meadow infection area found last fall. This constitutes the third infection center found in the Long Meadow area. It extends for a few chains each way in a small draw on Three Bear Creek, seventeen chains from the junction of Three Bear and Meadow creeks, and about two chains up the slope north from Three Bear Creek.

The infection dates back to 1923. Practically all of the pines are infected and cankers are very numerous, often several hundred to a tree, and many to a branch. The cankers are chiefly in the young stages previous to aecial production. Damage will resemble that at Daisy Lake, British Columbia, in that the trees will be killed by the death of branches, rather than by cankers entering the trunks. Trees infected are twenty-one to forty years old and from five to thirty feet high.

The Ribes responsible for this infection consisted of R. lacustre and R. viscosissimum associated with the infected pines. There is indicated the importance of these two Ribes in the intensification of the rust on pines.

This infection center was found in the course of a damage survey consisting of strips 13.2 feet wide put in every five chains

at right angles to the stream and extending beyond the limits of infection. A record on each strip is made of the pines, Ribes and infection on both hosts, and constitutes a two per cent cruise of the area. This principle of a quantitative damage survey is being applied on all of the infection areas in Idaho and will be applied this summer to the Rainier National Park infection.

This write-up is not based on strip line data, but is simply the result of the writer's hurried examination of the area in company with S. N. Wyckoff, C. C. Strong, H. R. Offord, and E. L. Joy on July 9.

HISTORIC FINDINGS NEAR UPPER REED'S CREEK CAMP

Paul Parks - Camp 4

Some fifty or sixty years ago the towns of Orofino and Pierce were booming due to the discovery and mining of large quantities of gold from the hills near Pierce.

The camps of the Headquarters Ribes hunters are located in the heart of that territory. Especially blessed in this regard, is the camp on Eureka Meadows on Upper Reed's Creek. The surrounding country gives testimony of the struggle for gold that has taken place here in the days before most of our fathers were born.

Working this territory reminds one of looking through a picture book. Each turn seems to have something new for you. The boys are anxious to get on up the creek to see what interests are in store for them around the bend of the canyon.

While falling trees for camp wood a sawed log was noticed in a mass of brush on the hillside. It proved to be part of a frame on which an old moldy water wheel was silently resting. It was far above the stream and where the water had come from to roll the wheel is a mystery still unsolved by its curious investigators.

After struggling through brush for some time in an attempt to construct a trail up the creek, two trail builders were hilariously happy to discover an old trail a few feet above them. It was almost wide enough to accommodate a team and wagon and a fifty-year old tree growing in it occasionally, testified as to when this donkey's boulevard was used.

A big ridge below a beaver swamp proved to be the remains of an old dam across the canyon of Reed's Creek. This dam when intact had been about three hundred feet long and had covered about ten acres of the valley with water. A well built frame for a twelve-foot water

wheel still remained. The gate to the undershot wheel was open and a small stream of water trickled through where some few decades ago tons of water undoubtedly foamed and roared.

The finding of ruins of old sluice boxes, flumes, and cabins are every-day occurrences but only one old flanged gold pan was brought in.

As one looks over these old moldy, decayed ruins, he tends to forget the whirl of modern life and sees once more the bewhiskered old miner, down on his knees beside the stream rolling his pan and watching intently for color. Occasionally he raises his head to squirt a stream of tobacco juice at a nearby boulder or glance at his mules across the meadow.

Again you may see him morticing logs into his cabin or pegging the framework of his shaker. The rust-pitted frying pan in the ruins of a cabin seems to flash a picture before your eyes of a flapjack turning over in mid air and the scent of boiling coffee is almost present. These pictures in the mind of the blister ruster on Eureka Meadows make him enjoy even the sight of a sawed stump or the sign of an axe stroke. It is this that causes him to lay aside his fishing rod or drop his horseshoes to spend the Sunday afternoon beside the stream shaking and rolling that old gold pan, hoping to find a flake of the yellow material that caused all the turmoil on our camp site some fifty or sixty years ago.

SEEN BY THE STROLLER AT CAMP 4

Olson, gazing longingly into mirror.

Wally Flynn looking into piece of same mirror cutting split hairs from his beard.

Roy Thaanum plucking Ribes during noon time.

Bo Henry flexing flabby biceps.

Fritchman inquiring as to the whereabouts of baseball cigarettes.

The cook hunting for Wilkie's 10-inch trout in the frying pan.

Dewey adjusting his unadjustable suspenders by tying knots in them.

Roy Lundberg, primping.

Cupp being primped.

Buckmaster late for breakfast.

Witter absorbing sunlight.

Lewis writing to his sweetie.

Gene Ware fumbling for a cigarette.

Lane hunting for a phantom orchid.

Lindsay shooting a bear with a camera.

Ken Sowder throwing the Bull (Henry).

LeRoy Parrish shooting Indians from ambush.

Ribes lacustre being tugged.

SOME LIVE STEM PHILOSOPHY

W. V. Benedict

E. L. Joy's article in the June News Letter entitled "A Check of the 1929 Eradication on Deer Creek" has interested me very much.

According to Joy's checking data on the seven plots used as a check of the regular twice-over eradication, there remained on one square foot of Ribes petiolare stream type two months after eradication work .03 of a foot of live stem. Expressing it in another way, this .03 of a foot of live stem per square foot amounts to 1306.8 feet of live stem per acre two months after eradication work. Two months is too short a time for many seedlings or sprouts to be included so I presume this figure represents only missed or partially chemically killed bushes. What would the remaining live stem be one or two years after eradication work? Apparently subsequent eradications will be necessary.

And next comes that old question again that is ever in my mind, what pine damage would we get from 1306.8 feet of highly susceptible Ribes live stem occurring in sites most favorable to the rust's development and dissemination? There is no question that the damaging power of the area has been tremendously reduced by the high percentage of live stem destruction but we must consider the hazard of what remains.

Now let us shift the scene from Idaho to California. Nothing conclusive is known regarding the relative susceptibility of R. roezli and R. nevadense but indications are that these species are much less susceptible than R. petiolare and R. inerme. Furthermore, they are not generally found in the heavy concentrations of the Idaho swamp type nor are conditions for the rust's development and spread as favorable in California as in Idaho.

If 1306.8 feet of live stem per acre in stream type plus the upland Ribes will not result in sufficient damage to prohibit the continued production of white pine in Idaho this volume of Ribes live stem could certainly be permitted in the stream type of the sugar pine region of California. And the distribution of the live stem would be more uniform in the sugar pine belt, which would in turn mean a more even nominal sugar pine loss.

Let us assume that 1306.8 feet of live stem per acre is a permissible amount to leave in the sugar pine forest stream type.* What effect would this have in the reduction of protection costs, assuming that this argument holds for all types. In the first place a high percentage of sugar pine type would require practically no Ribes eradication. And in the second place, those areas needing Ribes eradication could be worked much more extensively and at a corresponding cost reduction. Present costs would be slashed many fold.

*I doubt if any such amount as 1306.8 feet live stem per acre can be left on an area. The true figure is undoubtedly much lower, but even so, a definite knowledge of the safe amounts will result in considerable cost reductions.

After all is said and done we have just about reached the end of the rope in large reductions in cost where men have to cover most of the ground and search for Ribes. If no Ribes are found at all it costs a minimum to send a crew in their search. Small cost reductions can no doubt yet be made in improved methods, use of chemicals, etc., but these will not be radical. The big reduction is coming when we know what percentage of an area needs no work, and how much work the other portion of the area requires. Herein is the crux of the whole problem in California as I see it.

During that interval while we wait for the rust's entry into this state would it not be well for us to confine an increasing amount of our energy to learning more about the rust's behavior, location (topographical), amount and species of live stem resulting in most damage, distance of spread, etc. Give the eradication man such data in black and white and he at least will not be working in the dark.

BUT AREN'T WE ALL
D.H.F. - Camp 4, Headquarters

A queer specie are we humans--especially we blister rusters. I am speaking only for myself, of course, yet I feel that this spasmodic burst of philosophy might apply to more of us.

Personally, when I signed my first contract I eagerly looked forward to a new and pleasant experience. June came at last and my expectations were more than realized. I was nearly overcome with the novelty of the thing and I wondered why I had wasted so many previous summers pursuing other lines. Soon, however, the novelty seemed to wear off and by the time fall came around I was almost willing to leave for home--not so sure I cared to return the following summer. Being a student, I went willingly back to the grind--not for the sake of the grind itself but because of the good times I knew would accompany it. Between occasional necessary moments of studying, I proceeded to have myself a good time--playing golf, taking the girl friend places, or what have you.

Winter passed and with its passing parties got to be a little tiresome and I seemed to get more enjoyment out of bull festing with other foresters or just plain day-dreaming, the subject naturally being past experiences. Memories of the previous summer crept in and strange as it might seem I began to feel a longing for the wide open spaces. My bed of soft feathers and clean white sheets lost most of its comfort and I began to long for a bed of wool blankets, canvas tarp and a cot padded with fir boughs. I even dragged out the good old calked boots and tried them on just to feel

their touch again. All too soon I was awakened from my dreams with the realization that there were finals to study for. Ages later, it seemed, these are over and into the old tin I piled and here I am!

Already I am beginning to wonder about things. I wonder what's coming next, I wonder who's out with my girl tonite, and I wonder who'll pitch for the Saints tomorrow when they take on the Millers. I know without wondering, though that I must get to bed pretty soon for in a couple of hours the cock (God bless him at all other times) will start pounding on his gong to get me up to repeat all over again what I've been doing each day for the last month--and will do for a couple of months to come.

Oh yes, I could go on and lose another hour's sleep telling my pet grievances but what's the use for I know darn well that when next June comes around and if I am lucky enough to get another contract, I will sign on the dotted line and mail it less than twenty-four hours after I get it. I will pile into the old flivver with the side kicks and we'll eat up the 2,000 miles as fast as an old decrepit Ford which has seen its best days will permit. Why? Don't ask me, please, for I don't know. Perhaps its that inside itch I can't scratch that draws me out where the good fellows and the wide open spaces are, or perhaps its because I'm what Shakespeare calls "the lover, the lunatic, and the poet" and I'm not a lover or a poet.

RIBES ERADICATION IN MT. RAINIER NATIONAL PARK.

M. C. Riley

Work on this project started on June 16, 1930 with a force of sixteen men and very good progress is being made. Only stream type has been eradicated so far with the idea of protecting the white pine nearest the Fish Creek infection area first. No Ribes infection has been found in any of the eradicated area.

A total of 218.2 acres was eradicated in June at an average cost of \$6.83 per acre for all classes. Of the eradicated area 7% was class M, 12% class D, 39% class C and 42% class B.

Four species of Ribes were found and a total of 62,878 bushes was eradicated. Of this number 65% was R. lacustre, 24% R. brateosum and 11% R. laxiflorum. The fourth species was R. sanguineum but there were only 16 bushes pulled so this is not included in the percentages.

The entire crew spent two days attending a fire school conducted by the Fire Prevention Engineer of the Park Service but it

is hoped that none of the instructions will need practical application this summer.

Several methods were used in removing string line from places where it might be unsightly and the final procedure was for the man following line to break the string every 30-50 feet and pull it in from the area already covered.

Some time has been spent in removing pulled bushes from along the highway and piling them up so that they could be hauled away. In working steep banks above the highway it has been necessary to use ropes to let the men down where the bushes could be reached. It has also been necessary to spend some time in removing rocks and debris from ditches and the highway.

SOME OF EVERYTHING

Here's to tent two,
The best in camp four
Which in turn is the
Best in the woods.
We have cougars and bear,
A deer here and there
And best of all we have
A cook.

He is chubby and fair
And sure burns the air
When the ants crawl out of the soup.
But he can't help but grin
When the old bear comes in
And begs for a snack at the door.

We've mosquitoes at night
That know how to bite
On a fellow's defenseless ears.
The no-see-'emssing with a
Vengeful ring and their
Conduct most drives one to tears.

It is surely a pity to write such
A ditty, but when "needs must" we'll try
Because Heinrich's the guy
Who orders the pie, so the
Least we can do is to try.

-----Elmo Cupp
Camp 4

DEPARTMENT MODIFIES QUARANTINE AS TO
WHITE PINE BLISTER RUST.

A revision of the white pine blister rust quarantine regulations governing interstate movement throughout the United States of white and other 5-leafed pine trees and currant and gooseberry plants went into effect June 5, 1930.

The revision adds to the list of States and counties designated as infected with white pine blister rust the State of Montana and those parts of Oregon not heretofore designated. Surveys during the past year revealed infection in northwestern Montana and southwestern Oregon.

Other changes include: (1) Further restrictions on the movement of currant and gooseberry plants to cover leaves of these plants: (2) removal of the requirement of State inspection and certification with respect to white pine Christmas trees without roots, and to white pine branches, moved during November and December from non-infected states when the movement does not involve passing westward across the Mississippi Valley quarantine line: (3) removal of certain special sanitation requirements so far as they applied to the shipment of 5-leafed pines from New York to the New England States and vice versa: (4) provisions for the separate inspection and certification of independent units of nurseries which grow and ship 5-leafed pines under the nursery sanitation provision applicable to generally infected States: (5) a requirement that 5-leafed pines shall not be moved from either Oregon or Idaho unless they have been grown from seed under the sanitation requirements heretofore prescribed for Washington and certain other generally infected states.

These modifications are based on changes in the blister rust situation in the course of the last two years, and do not, in the judgment of the department, involve increasing the risk of spreading the disease.

(Official Record)

FOR HOW LONG?

G. A. Root

The revision of the blister rust quarantine, effective June 5, 1930, is issued "primarily for the purpose of extending the list of states and counties designated as infected with the white pine blister rust to include the State of Montana and those parts of Oregon not heretofore so designated." There are other changes of interest to shippers of blister rust hosts, relative to the extension of time as to when they may be shipped. In addition, special regulations have been made with reference to requirements on sanitation and certification.

California now remains officially, the last non-infected state of the western group - but for how long?

DEFECTIVE CHEMICAL APPARATUS

L. L. White

The work, both chemical and hand eradication, is well under way for the field season of 1930. It seems that in the past season, defects in chemical apparatus were never revealed until the apparatus was actually being put to use in the field, and this season is no exception. After the first two days of spraying, three tanks from a four-man crew were brought back to camp for repairs. They were all leaking very badly at the joint where the hose is connected to the tank. Last season we had no trouble whatsoever with these joints, although the hose cracked perhaps once or twice during the season, but this was remedied by cutting off an inch connection again. This shortening of the hose, however, was not enough to cause any hindrance in freely operating the pump.

This year it seemed necessary to prevent the shortening of the hose and this was done by adding an elbow extension to the metal connection at the base of the tank, thereby preventing bending of the hose at that point. To further prevent this bending, extremely heavy hose was sent out with the apparatus.

As the connection at the base of the tank is quite long, due to the elbow extension, it is caught in the brush, thereby producing a stress at the joint where the connection is welded to the tank, this stress being greater than the joint will stand. As a result, the solder is cracked off and no rigid connection remains at the joint. As the heavy hose is so stiff and unpliant, it also aids in cracking the soldered joint. The repair equipment available is not sufficient to repair these tanks satisfactorily in the field. In order to obtain satisfactory service from the tanks for the remainder of the present field season it will be necessary to use lighter hose, and to move the elbow extensions or else braze a heavy piece of metal to the tank around the joint where the connection is welded to the tank.

A solution for the whole problem would be to find some means by which the apparatus could be tested before sending it to the field, thereby eliminating a lot of grief in the field where time is valuable.

BLISTER RUST CAMP #4,

EUREKA MEADOWS

F. J. Heinrich

Back again, not dolefully, but cheerfully at our work, swearing, laughing, toiling, as in the years of the past.

Our camp at the present is located in a most ideal meadow on Reed's Creek. Shepherders and historic mining facilities make

the environment most fascinating. A better camp site and a more contented group of fellows could never be found.

Although we are enjoying life we have not overlooked our main purpose of being here. Work is plentiful and we are doing all that is possible to become better acquainted with it. Ribes petiolare and R. inerme are abundant. So far the R. inerme has been our only meat, but R. petiolare will fall likewise in the near future.

The small camp policy has been working very satisfactorily. The camp morale appears to be higher, which directly leads to better and more efficient work. Shorter distance to work has always been realized as a great asset. This is now made possible due to the fact that we can move more easily.

We have been making it our policy to put into practice all of the old ideas that have stood the test in the past. Also realizing that there are possibilities for improvement, a few new ideas are being tried and to date they are working very successfully. A daily progressive record map 4" to the mile is being constructed by the camp foremen. Daily, after work, they add the territory they have previously covered, making all notations on the map. The map is large and has proved very beneficial to both foremen and camp bosses. We have found it very practical to have the assistant camp boss divide his time with each crew, working both with the foremen and the crew men. Not as a spy, but as a help to the fellows. He is more experienced and can help them solve their problems more successfully.

Although everything in general has been going smoothly, we are also facing difficulties. A little warning to other camp bosses may prove valuable. The fellows have been working well, but to leave the old swimming hole, the pet bears, and the wonderful meadow I'm afraid is more than they can stand. If they labor as they have, we will be forced to move. There is only one alternative. May the Lord help us, that they do not take it.

A DISSERTATION ON NO-SEE-EMS

How could our minds leave this ethereal wonderland were it not for the present distraction offered us by these dainty little winged creatures, the no-see-ems.

Since our no-see-ems are better educated than those at other camps, our relations with them are philosophical. Although they are of a larger species and have enormous proboscides, they emit a warning rattle, and their nips are very gentle, thus compensating us for our altruistic attitude--the lousey little devils.

DABBING IN OIL.

W. V. Benedict

We have just completed an experiment which had for its purpose the comparison of costs of spraying with oil versus grubbing on a 6 acre cut-over area of heavy Ribes (343 per acre). The Ribes on the area were mostly large old bushes. Spiny Ceanothus brush was also abundant. Grubbing conditions were therefore difficult.

Three man days, plus 76 gallons of oil were required for the spraying job. It took seven man days to grub the Ribes from the area.

Figuring 18¢ per gallon for oil and \$6.25 the cost of one man's time for one day, the per acre costs were:

Spraying	\$5.41
Grubbing	7.29

This amounts to a per acre reduction of \$1.78 in favor of spraying.

Additional experiments in heavy Ribes and experiments in medium Ribes are now under way.

As I see it now, spraying appears practical in accessible areas of numerous Ribes. The difficulty of grubbing will also be an influencing factor in deciding whether or not to spray.

In inaccessible country the cost of transporting chemical or oil will prove a determinant in its use.

Large scale use of oil will probably not be feasible.

ABOUT THE GERMINATION OF RIBES ROEZLI SEEDS.

F. A. Patty

Last fall a cedar box measuring three feet long, one foot wide, and four inches deep was sunk in the ground so that the top of the box was level with the surface of the soil. A cover made of fly screen was placed over the top for a lid. The box was divided into ten compartments and into each one of the latter approximately 3,500 seeds of Ribes roezli were placed. The seeds were not covered with soil but were left exposed to the rain, snow, frost and sunshine. It is probable, however, that very little sunshine reached the seeds as the box was in a shaded place and the fly screen covering must have shut out most of the sun's rays that passed through the vegetation.

On June 15, 1930, the seeds were examined and it was found that several hundred of them had germinated. It could be plainly seen

that water had covered the seeds earlier in the year. A few of the compartments were still full of water and no germination had taken place in them.

From the observations made on this germination box it would seem that R. roezli, under these conditions, is one species that is able to germinate in the presence of very little sunlight and at relatively low temperatures. These conclusions must be considered as tentative because the amount of light and the temperatures were not measured.

However, it may be said that R. roezli seed do not need a rest period of several years under field conditions but may be produced during one season and germinate the next. The seeds which were placed in this germination box were gathered in August, 1929.

OUR POME

In tent one you will hear
If you're there about eight
Bullfests philosophical
stories unrelatable
That our experts relate.

In tent two you will find
Stroll around about ten
Booty compassable
From cook unsurpassable
It's the hard eaters' den.

In tent three you will see
That it's the home of the card
Bridging for cigarettes, hacks or bars
They're quick to pay up and
They lay hacks on hard
Thus ends the offering of
Camp 4's bard.

NEWS NOTES FROM THE O.S.C. RIBES GARDEN

Many species of Ribes are under cultivation at the O.S.C. Ribes garden on the college east farm near Corvallis. These are: Ribes klamathensis, R. irriguum, R. niveum, R. menziesii, R. watsonianum, R. divaricatum, R. echinellum, R. marshallii, R. binominatum, R. velutinum, R. Goodingii, R. sanguineum, R. glutinosum, R. wolfii, R. petiolare, and R. acerifolium.

The Department of Horticulture has carried on experiments the

past spring in cross pollenation of R. irriguum, R. klamathensis, and the Oregon Champion with R. echinellum.

All of these experiments have been successful, but the most outstanding results were produced with R. irriguum. This species produced a delicately flavored fruit which has great commercial possibilities. Dr. George M. Darrow, Senior Pomologist in the Washington, D. C. offices of the Department of Horticultural Crops and Diseases, became very enthusiastic over these fruits during his recent visit here, and intends to enlist the aid of men at Washington in furthering the work.

Seeds of several varieties of Ribes from the garden have been collected and placed in sand and will be buried in deep soil in preparation for germination next spring. This method of storage was developed by A. F. Yeager of the North Dakota Agricultural College and is said to be very satisfactory. The seeds will be ready for use at Moscow or elsewhere when needed.

BUCKMASTER'S FIRST FISHING TRIP

Tying his birchbark canoe to a sturdy mahogany, he got out and stretched a bit. "Buck" had no fresh water tackle along so he dumped a barrel of salt in the pool and used his deep sea tackle. He adjusted his block and tackle (he thinks this is a dance but we know it's something in football), a piece of blue denim (this could just as well have been khaki). Concealed in the overalls was a bent pin with which to invigle Cutthroatus Troutii from his super-saturated abode. After washing his feet in the pond for good luck, Buck partook himself of an enormous chaw of Chittin bark and seated himself on a soft rock (we have them here - ask Ripley). The moonbeams flitted gently o'er the brink. He drew his mighty arm backwards flinging the first 100 feet of his line, when alas! (no it wasn't a lass, it was Wilkie, Flynn and Dewey singing a duet - "Nearer My God to Thee" and "Learned about Women").

Now we'll continue with "Buck's" cast. Before his mind could return to his piscatorial efforts his mighty bent pin had snagged some 200 yards up the hillside on a cedar. Thus ended Buckmaster's first fishing trip in a volley of blasphemous cursing. Alas, alack, (What's a lack?)

If we had the eggs we'd have ham and eggs, if we had ham.

I got up, put on my clothes, washed, brushed my teeth and said "good morning" to Fritchman. I went over to the cook tent. We had some wonderful hot cakes for breakfast; the syrup was lovely. The coffee was steaming hot. No! That coffee was cold. Oh! There was no coffee. That wasn't syrup, it was water. But it wasn't even

water, and we had eggs instead of hot cakes; still there were no eggs in camp so it couldn't have been eggs. I remember now, my plate was empty. I looked for my plate and it was gone. In fact, the cook tent wasn't even there. Fritchenman was out of camp.

My teeth had green fur on them, I really hadn't washed them. But I at least had teeth. No I didn't. (Yes I did. They were in my pocket.) My face was kind of dirty. There was no water. May be I didn't wash. In fact I was naked. No I wasn't. I had my night shirt on. I hadn't even gotten up yet. Bang! Bang! Bang! There goes the breakfast drum now.

NOTES FROM OREGON

The blister rust exhibit at the Eugene meeting of the A.A.A.S. called for a half column write-up in the Sunday Oregonian of June 22. The article was a bit misleading as it gave the impression that a talk had been made at the meeting on the subject of blister-rust, which was not the fact. The write-up was taken entirely from the set of "Questions and Answers" on blister rust.

L. N. Goodding delivered a short paper on Didymosphaeria oregonensis, an organism associated with a canker of Alder.

Dr. S. M. Zeller delivered a paper on "Some Species of Atropellis and Scleroderris on Conifers in the Pacific Northwest". This was based on a paper by Zeller and Goodding to appear in an early issue of Phytopathology. The chief item of interest to blister rusters was the description of the canker disease of western white pines which occurs commonly in the Pacific Northwest. The organism produces black bodies and resembles in its action the work of Dasyscypha. The same organism has been found on sugar pines and lodge-pole pines.

A very heavy infection of mistletoe on western white pine has been found in the Mt. Hood National Forest. This appears to be Razoumofskyia tsugensis, a species not reported on western white pine. A more careful study may prove this to be incorrect. As western white pine is rarely attacked by mistletoe, blister rusters should note any occurrences of this pest.

J. S. Simmonds, cook for the past several years for the Oregon blister-rust camps, spent about four months in the Veterans' Hospital

last winter. While there, he underwent an operation for a serious varicose condition of veins in one of his legs. On the advice of his doctor he took the cooking job at Still Creek this year, but on June 29 was forced to go back to the hospital with a serious complication of his trouble.

NEW PINE INFECTIONS

E. L. Joy

During the latter part of June, three small pine infection centers were found near Elk River on the Potlatch Association by Chapman. Two of these were on Cameron Creek and one on Johnson Creek, a tributary. Stream-type eradication of *Ribes* is being done in these drainages this season.

A brief outline of these infections follows:

1. Cameron Creek, 7.4 miles from Elk River on Bovill road, T. 40 N., R. 2 E., S. 31.

Good stand of pine, 21-40 age class.

Ribes petiolare abundant along stream.

R. lacustre scattered in stream type and along the lower part of the slope.

4 trees infected.

4 juvenile cankers.

2. Cameron Creek, 8.4 miles from Elk River on Bovill road at forks of creek, T. 40 N., R. 1 E., S. 25.

Few scattered young pines, 21-40 age class.

R. petiolare moderately abundant along stream. *R. lacustre* scattered in stream type and along the edges.

4 trees infected.

7 juvenile cankers.

1 pycnial scar canker.

3. Johnson Creek, $1\frac{3}{4}$ -2 miles above road, 7 miles from Elk River, T. 40 N. R.2 E., S. 19.

Excellent stand of pine reproduction on cut-over area.

R. petiolare, *R. inerme* and *R. lacustre* are abundant in the stream type and *R. viscosissimum* and *R. lacustre* along the slopes.

9 trees infected.

1 first-symptom canker.

8 juvenile cankers.

- 3 pycnial scar cankers.
- 4 fruiting cankers.

From the canker analysis it is clear that these infections originated in 1927. In all probability the Long Meadow Creek infection, which is about 5 miles southwest, was the source of the spores starting these centers.

THE CALL OF THE MUSSELSHELL

Along in the middle of May when studies and school in general began to get dull and monotonous, a sweet little missive arrived from the Spokane Office, asking if the writer desired employment again this summer in Ribes eradication. Instantly, vivid pictures flashed before my eyes, scenes of the gang we worked with, the camp, the river, the woods, and a thousand and one other memories of blister rusting.

The ice cold mornings when we had to roll out at the bang, bang of the dish pan, the swollen arms, faces and necks from continual attacks by mosquitoes, no-see-ems, and yellow jackets, seemed to have faded into the background. They were but minor details that helped us to appreciate a happy and profitable summer in the Blister Rust Camp on the Musselshell.

Little did I realize at that time that I would soon be hiking over familiar trails with old pals. But a couple of weeks later when the contract came around and gave the Musselshell Ranger Station as a summer address, and with "Swanee's" own signature on it, I almost broke a finger signing it. Then to meet most of the same old gang at Orofino made everything about complete, oh! what a grand and glorious feeling to be liberated from school worries, and to be once more a care-free Ribes chaser out on the Musselshell.

CEDAR CREEK CAMP

Lee Hunt

The Forest Service Blister Rust Camp, under the able leadership of Jim Thasnum, has been in operation almost three weeks on Cedar Creek, which is one of the main tributaries flowing into Lolo Creek. In this period of time the men have become accustomed to their surroundings and fairly well broken in to the work of Ribes eradication. For men new to the work they are showing, practically without exception, promise of becoming an efficient organization that spells no good for the innumerable Ribes found in this district.

Although hampered by unfavorable weather, the eradication has progressed rapidly enough to necessitate the moving of camp in the near

future. For the first few days all the men were put to hand eradication in order to teach them to "know their Ribes". A few men were selected from each crew to form a couple of knapsack crews to spray the heavy concentrations of R. petiolare along the streams. This work has been handicapped by wet weather but a considerable acreage is being covered. The men spray out on the average between 25 and 35 gallons each. The chemical used is Atlacide which is very efficient in the percentage of kill on R. petiolare. The record for any one man is 46 gallons in one day, which, as knapsack work goes is high, even in heavy concentrations of Ribes. If other Blister Rust Camps are putting out the amount of work and equalling the progress of Camp 2 on Cedar Creek, Ribes eradication will have a big summer, and a large area of valuable timber will be protected.

NOTES

W. A. Rockie returned July 7 from Washington, D. C. where he has been working up ecological data for the last four months.

* * * *

H. N. Putnam returned to the Spokane office June 28. He spent the last five months in the East working on pine measurement studies and taking a course in statistical methods.

* * * *

H. G. Lachmund and J. L. Mielke of the Office of Forest Pathology at Portland, Ore., visited the Spokane office July 2.



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W E S T E R N B L I S T E R R U S T

N E W S L E T T E R

* * *
Summer Issue No. 2
* * *

U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister Rust Control
Spokane, Washington

NEW INFECTION ON MT. RAINIER NATIONAL PARK

M. C. Riley

On July 30, L. N. Goodding and the writer found pine infection in the white pine area at Longmire, Mt. Rainier National Park.

The infection covered an area of about one acre along the Nisqually River and was immediately adjacent to an area of heavy Ribes bracteosum which has been eradicated. The first part of July an infected R. bracteosum was found about 100 yards from the infected area.

There was a total of 47 trees on the area and 10 of these were infected as is shown in the following table:

ANALYSIS OF INFECTED TREES

Tree No.	First Symptoms			Juvenile				Tree Description					
	Year Wood Infected			Year Wood Infected				Age	Ht. Ft.	DBH In.	Crown Class	Needle Stem Ft.	Years Needles Borne
	1924	1925	1927	1924	1925	1926	1927						
1	1			1	16	19	11	32	11	2½	Sup.	180	6
2			1					15	3		"	2	4
3					4	5		20	5	1	"	20	6
4					1			15	13		"	5	5
5		1						18	4		"	20	5
6		1			2			32	7	1	"	30	5
7						1		10	1		"	2	5
8					2			21	5	1	"	90	5
9	A killing canker on trunk at base of tree - fruited 3 times, 18" long. No other cankers on this tree.							18	6	1	"	30	6
10	A canker 2½' long, 1' of which was on trunk, 10' above ground, fruited at least four times, on '18 and '19 wood. No other cankers on this tree.							35	30	6	Dom.	480	5

The remaining trees were scattered through the area and ranged from 5 to 24 years of age, from 1/2 to 6 feet in height, had from 1/2 to 20 feet of needle bearing stem, bore needles from 4 to 6 years and were all suppressed.

The Park Service immediately removed all white pine trees in the immediate vicinity.

THE OFFICE ELEPHANT AGAIN

H. R. Offord

We have all heard gruesome tales of a white elephant which has been appearing with monotonous regularity on all those festive occasions when

serious minded blister rusters foregather round the conference table. The visibility is very poor in the old meeting house but through the heavy, low hanging smoke clouds of America's really good five cent cigars may be seen this office elephant thrusting his long white trunk into every dish of the food for thought served to the assembled multitude. The beastie is very white, very much respected and very old. In fact we have ceased to discuss his presence, so great is his age, so much is he respected and so dazzling is his whiteness. Yet his presence amongst us is the eternal question, "What is a foot of live stem and what is a Ribes - especially R. inerme and R. petiolare?"

Occasionally a doughty soul arises, places lance in rest and rides full tilt at the pachyderm, only to see his lance splinter in his hands and his horse reel under him, the while his fellow men smile with patient tolerance.

At the present moment said elephant has taken up what appears to be permanent residence on our Clarkia experimental plots. "We knew he would, but we had hoped he wouldn't" is our only alibi. Albeit he is with us and the task of measuring live stem and bush kill resulting from the application of ninety-odd spray formulae is difficult enough considering factors of beaver work, stream erosion, imperfect application, trail cutting, and fishermen tramping, without having the old office elephant thrashing about over every plot.

This venerable old question of what is a foot of live stem or what is a Ribes seems to the writer to be incorrectly phrased. Our troubles do not start with one Ribes bush or with one foot of live stem, nor with two or three bushes or two or three feet of live stem. As a matter of fact, the pain is not really acute until we approach a few hundred feet of live stem. Somewhere about this point evolution and biological strains in the species *Homo sapiens* come into play and our data begin to wobble. In effect this means that a large scale field experiment can only be used to test factors of certain magnitude, that is, factors which involve a possible difference greater than the mean error involved in making the experiment.

At Clarkia we are looking for differences in live stem and bush kill resulting from the application of a number of different spray formulae. These differences may range from 1% to 20% and the total experimental error (application of spray and taking of data the following year) must certainly be 10%. It is easy to foresee a just and unanswerable criticism which can be leveled against such experiments.

With the experiences of his own project in mind, the writer is about to introduce a resolution designed to make an end run on the family elephant rather than attempting another frontal attack. With courtesy to all and retractions to none, it is submitted herewith - "that large scale field experiments designed to serve as a basis for refinement or modification of existing methods are unsound and unscientific when they show differences

of 10% or more, until the methods of experimentation employed have been shown to involve an error whose maximum is less than the minimum for the resultant data, and furthermore that small scale field experiments in which human equation is reduced to its smallest size is a more accurate measuring stick of field factors small in magnitude".

The ideal field experiment is one which is large enough to average out individuality in the "experimentee" and small enough so that the "experimenter" does not become tired and do faulty work in the course of the experiment. It is difficult to draw the precise line between these opposing forces but we should not lose sight of the latter in our enthusiasm for the former. Suggestions and criticisms are badly needed and the ideas of the men who constitute the labor side of the picture during our all too short field season will be most welcome.

OUR FIELD EXPERIENCE

Ethel K. Mellon

We were so thrilled last week when Mr. Wyckoff consented to let us visit one of the camps, Mr. Staat's at Clarkia, that we all promised we'd behave ourselves - which we did!

Mr. Schiftner - Charlie, I think they call him - is the loveliest cook! Miss Lynch was thinking of trading her mother for him, if he were willing. A lot of the rest of us thought it was a good idea, but she had first chance because she suggested it. Even tho we were late he got us a wonderful breakfast, and altho I don't like to get personal I must say that Miss McWold did enjoy the omelet, at least I was sitting next to her and it looked like she did.

After breakfast Mr. Staat took us out to see the work. We walked and walked and finally we came to the first signs of activity - a lot of boys hiding around in the bushes and on logs. They had on rather odd clothes not at all like woodsmen you see in the movies, so I guess maybe they were rather bashful about working out in the open. There was string hanging high up on all the bushes and we thought they were to put Chinese lanterns on and maybe we were going to have a garden party that nite, but we didn't. I don't know why. Then we walked and walked some more and finally came to three boys sitting on a log. They said they weren't working because it was lunch hour. I don't know how they knew, they didn't have a clock and I didn't hear any whistle blow. But they were very nice and got up and showed us a lot of interesting things. One of them, Louis was his name, told us about a chemical that took fire very easily - "highly combustible" he called it. He had a rag soaked in it and showed us how dangerous it was. He'd light it and light it but it wouldn't burn very well and he'd keep saying "It's a little too wet". It must have been. Then another boy named Lacy put a tank on his back and squirted some water at a bush out of a long push-pull affair. That

is hard work because the tank is supposed to be heavy but I lifted it and it didn't weigh much. Maybe those boys aren't as strong as they look.

After that we had lunch and everyone settled down to rest and enjoy themselves. There were two phonographs and a lot of records and the boys let us use their tent and cards and everything. I think Mr. Staat must have given them a lesson in etiquette before we came up, they were so polite. It was very nice, and so unexpected in the woods and all. And Mr. Staat showed us a lot of ways to tie a rope and told us about the bear that came down near the camp. We didn't see it, but the story must have been true - Mr. Staat has such an honest face.

When we had all rested enough we went swimming. The road was pretty rough, but every time anything was said about the bumps Mr. Breakey would say, "You should go over those roads to Headquarters and the Musselshell." I guess the road wasn't so bad after all. The water, in the swimming hole I mean, was pretty cold but they said it came down from the mountains and was supposed to be. They had a place on the bank where we stood and dived off but it was hard to keep from scraping bottom, altho we tried. Oh, yes, before we went swimming Mr. McDaniels showed us another plot that was different from the others. They put the chemical on the Ribes instead of spraying it. I didn't hear much about it, being more interested in other things as you might say, the swimming hole and climbing under barbed wire fences. Mr. MacLeod asked a lot of questions, tho, and I'm sure he could tell all about it.

We were pretty cold and hungry when we got back to camp, but the boys were eating dinner, so we waited. It was hard to keep from watching them because the food looked so good, but having been brought up, so to speak, on Emily Post, I knew that it was not etiquette, on account of people using knives instead of forks, etc. We kept getting hungrier and hungrier - all but the bridge players who didn't seem to notice the passage of time - and when we got a chance we surely did justice to Charlie's cooking - especially the biscuits. Mrs. Jump says Mr. Jump doesn't eat very heartily but I thought he did quite well, also everyone else. Mr. Klatt ate tomatoes, too, and he never eats tomatoes.

After dinner the boys made a camp fire and we all sat around and sang songs that I'm sure made the boys think of home and mother, etc., because they looked so sentimental. We had an awful time getting the musicians started but Mr. Pence played the banjo beautifully after he got started and Mr. Corneil was much better than you'd think because he was so backward about playing. Then we had toasted marshmallows - and it was all very lovely. If I were in a blister rust camp I'd want a camp fire every nite because the songs and marshmallows have such a softening effect after the killing all day long. We went home then because Mr. Staat said the boys must go to bed at ten o'clock and we knew it must have been a hard day for them, entertaining us and being polite and all.

We want to thank Mr. Staat and Charlie and all the boys for asking us to visit them and not only tolerating our foolishness but even

joining in. We had a glorious time and we all said "Them's my sentiments" when Mrs. K. said she'd never be fool enough to turn down an invitation to a blister rust camp because they treat you so royally and you have such a good time. That's not a hint, but - well, anyway thanks again!

ERADICATION ON MT. RAINIER NATIONAL PARK

M. C. Riley

During the month of July, 102.3 acres of stream type were eradicated on Mt. Rainier National Park, divided by classes as follows:

Class B	29.4	acres	at	\$5.70	per	acre		
"	C	33.6	"	"	11.58	"	"	
"	D	32.6	"	"	26.23	"	"	
"	M	6.7	"	"	34.50	"	"	

A total of 118,315 bushes were pulled of which 49.8% was Ribes lacustre, 25.2% R. laxiflorum, 24.7% R. bracteosum and .3% R. acerifolium.

The Nisqually River was completed on both sides to within about 15 chains of the Glacier bridge; Van Trump Creek was completed to Christine Falls, and Paradise Creek and its tributaries have been worked to Madcap Falls. The area between the road to Ricksecker Point and the Canyon Rim is nearly completed.

Due to the increased difficulty of working, less than one-half as much area was covered in July as in June. Frequently a three-man crew will spend nearly an hour in eradicating one bush and certain small patches have cost as much as \$150 an acre to eradicate. Dense alder thickets, with a heavy mat of R. laxiflorum underneath are a common sight and frequently the roots of these bushes are buried for over a foot in sand deposited during high water.

There have been two areas of R. bracteosum where there was absolutely no place to hang the bushes, so they were piled up on the ground and when the top bushes are dead we will turn the pile over so those bushes on the bottom will die.

The crew in Rainier believes they have established at least one record for the present season because no time has been lost on account of rain or fire.

AT CLARKIA IDAHO

Lawrence C. Pence

In undertaking the control of blister rust, the Department of Agriculture has necessarily involved itself in an extensive program of

experimentation. The project which is being carried out at Clarkia, Idaho, though a small portion of that program, is one which it is hoped may prove a great aid in the saving of the white pine industry of the United States.

Clarkia was chosen as the location of this particular experiment as it afforded the unusual advantage of having in great quantities all the important types of Ribes; Ribes petiolare, R. inerme, R. lacustre, and R. triste grow in sufficient numbers for practical experiments, and R. viscosissimum appears less frequently. Also the ground presents as great or greater eradication difficulties as will be found in any commercial area. Various habitats are afforded all species, the brush is extremely thick in most places, and the beaver dams are very abundant. The last two factors, while contributing toward the makeup of the typical eradication site, are a great disadvantage in the experimental work as they make difficult the acquiring of accurate results on the sprays used here. However, as the plots at Santa are being used to obtain the "fine" results of each spray on tagged and carefully guarded bushes, the Clarkia chemical experimental plots may be used as a basis upon which to expect results on commercial jobs under the usual working conditions.

Last season approximately thirty different sprays, varying either in plant killing components, concentrations, hygroscopic agents, stickers, or pH values were used through four rotations of about three weeks apart. These sprays were employed on half-acre plots covering the stream bottom of Merry Creek and extending a short distance on the hillsides. The object of the work of this year is twofold; namely, to obtain the best possible results on the sprays of last year and to respray certain plots with the same sprays as last year. The second object is to experiment with new sprays and with crown applications.

The checking of last year's plots has presented many new problems in checking methods. The results so far have tended to be discouraging. No consistency has been noted in results of the same spray of different rotations. Neither has the variance of concentrations, pH values, or use of hygroscopic agents thus far given any consistent ratio in results between the sprays, on any one species or combination of species. Though better results are expected in the future, the present inconsistencies tend to lower the morale of the checking crews which desire to have something to show for their efforts.

The modus operandi as far as checking goes, has itself been the subject of much experimentation. The initial trial of results at optical estimates prior to spraying, was necessarily soon abandoned as being too inaccurate and too negligent of various conditions which must be considered in obtaining a true idea of the value of a spray following treatment. Next was tried a method by which each bush was inspected; whether it was sprayed or missed by the sprayer was determined, and finally the per cent of kill was estimated. However, this too was regarded as too inaccurate, negligent of certain conditions and did not give specific figures on feet of stem, a

factor necessary in the compilation of a report on the project. The manner of checking now involves the actual count of all stem of smaller bushes, dead and alive. The larger clumps are carefully estimated. Thus every Ribes bush on the plot enters into the result for the spray. Estimation of the larger clumps varies somewhat with the crew, each man using that system which seems most feasible and easy for him to employ. The actual count of bunches of stem and the mental division of them into the larger clumps proves a fairly accurate way of obtaining results. Again, the actual count of a square foot area of stem and the multiplication of the resultant figure into the remaining area, often proves satisfactory. As a rule, by careful inspection, a large clump of Ribes stem may be estimated to a minimum degree of error.

Every Ribes bush is counted for three types of stem: Surviving live stem includes that which was growing the previous year at the time of spraying and which is still now growing, having survived the effects of the chemical. New stem refers to that which has grown on the surviving stem during the current year and also any new sprouts. Dead stem is that which has no leaves upon it. It is found either as dead from the crown or from the last leaf or green bud of the surviving stem.

The count of dead stem presents the greatest difficulty to a checking crew. First, the separation of dead stem of Ribes from that of other dead brush must be accomplished. The way in which a stem breaks, the more or less uniform diameter of the stem, the high degree of branching, the reddish or black-blue color tone of the bark, the characteristic peeling of the bark, and the consistently brown or tan pith, are signs by which dead Ribes may be distinguished from foreign dead stem. The next difficulty arises in the fact that entirely killed Ribes bushes of two or more species often appear together. A checker, however, after some experience is able to distinguish between them. It is noted that the pith of R. petiolare is lighter brown than that found in R. inerme, and has a reddish tinge to the bark, while that of the latter is almost black. R. lacustre has a more awkward, scraggly growth and the pith is light tan. A third difficulty presents itself in the determination of stem killed by spray from stem killed by natural agencies such as beaver, snow, overshadowing, and dead stem of long standing. Such factors, of course, decrease the efficiency of a checking crew.

Along with the work of obtaining specific figures by which to judge sprays, numerous opportunities have presented themselves to obtain concomitant results on methods. By making a record of feet of live stem which were obviously missed last year by the sprayer, a "sprayer's efficiency quota" is being formulated. Again, an attempt is being made to create a basis or measuring stick by which the merits of this system of checking may be judged. About twenty-five per cent of the plots are being gone over and rechecked a second time. The results of this review are compared with those of the initial check. A per cent of difference is then computed for each specie and each type of stem. The average per cent of difference is then

calculated, - each individual per cent entering into the final percentage according to the amount of the stem from which it was obtained.

Again., effort is being made to compare this more dogmatic checking method with a refined system of ocular estimating. Every checker is making a careful cruise of each plot before an actual count of Ribes ~~stem~~ is made. He sets a chemical effectiveness rating on the plot from the average per cent of kill he has noted on a number of representative bushes of each species. In this manner, a greater number of opinions influences the final rating. The difference between this result and that obtained by the actual count method is being noted in view of the possibility that the ocular method may be adjudged more proficient and less expensive. A record of the man hours of both systems is being kept. Also, a study is being made of crown kill, regardless of stem kill. The presence of sprouts is the guide by which each of the two ocular estimates is made. It is believed that the crown kill may be of greater value than the live stem kill in determining "spray effectiveness."

Finally, provisions are being made by which the variance of kill may be studied according to habitat; that is, according to exposed stream bottom, or to the shaded hillsides. All these various factors, ratings, and studies help make this an interesting experiment which very likely will prove to be of great value later on. They entail a large amount of office and statistical work. The respray plots are divided into respray and control halves. Results and efficiencies must be figured on both halves and then on the whole plot. A large progress chart is being formulated upon which all data, results, and ratings are recorded in concise form.

BLISTER RUST CAMP 1, HEADQUARTERS

Tom Onstat

Camp 1, a 15-man unit, is now located on Meadow Creek eleven miles from Headquarters, Idaho. Here are found four crews of huskies that daily wage war on the Ribes.

Four species of Ribes are abundant and are being eradicated from the stream type. Namely, Ribes inerme, R. lacustre, and R. irriguum which are hand-pulled, and R. petiolare which is sprayed. Occasionally R. viscosissimum is found along the creeks also.

During the month of July, Camp 1 eradicated an area of 327.5 acres; hand-pulling a total of 48,109 Ribes and spraying out 3,197 gallons of Atlacide.

In moving by pack train from Calhoun to Meadow Creek the bulkiness of certain items of kitchen equipment proved a hindrance. Standardization of these articles would lessen bulk and thus create a valuable saving in both time and mules. The portable meathouse also stands in need of improvement along construction lines which would increase strength and utilize a finer type of screen.

WHO GETS THE CREDIT?

C. M. Chapman

It was interesting to note that the July article "Western Program" failed to give the secret of the success made by that small group of men who began the western control of blister rust some seven or ten years ago. No doubt it was modesty on the writer's part, but one may be assured that in work so far fetched the results thus far obtained have depended largely upon the cooperation and support of persons more or less familiar with the white pine tree. That being the case, it must have been ever in the mind of that group of men to be tolerant and patient in arousing the interest of those people to aid in protecting the young white pine stands for the future generations against the silent ravages of the blister rust.

Only tolerant men with courage, vision of the future, a progressive mind, and quick to take advantage of new ideas, could have made possible the methods now used.

The time is not far in the future when blister rust protection will be as easily applied and cheap per acre as fire protection and no doubt more effective.

Much of the actual work and public contact now falls on the shoulders of younger men of the office and they should be ever mentally alert as that small group of men who laid the foundation of a successful program.

Clarkia, Idaho

Messrs Kurmutt and Cowling Miller
Fotografters and Edditurs in cog
Bluster Rust News Bilding
Spokane, Wash.

Bruthurs:

You boys are all quiet well accuanited with Clarkia no doubt, hay hay? Well, the Federel men cawt the local bootlegger the other nite. There has bin a crate down on Billie Mann's cow pasture and the citizuns have bin up in the air about it ever since. You remember the last milk you drank hear dont you? Well the airypplane must have scared the cows into the weeds and we have had to do the same or follow suit as you mite say in pokur. Them cows have took to eaten jimsun weed or something equully

feerce for we shur are in bad strates and no missteak boys! Now take Chuck Cross for an upstanding eggsampul of locul condishuns. Why that boy is simplee waisting away, running to and fro with stummuck trubbl and what knot. Harry Faulkner and Al Rochat have been closed seconds in this regard but all of us are in aboutt the same boat. We had quietan epidemic of appendicidussus and gastral disturbuncus. Louie Keyser our kemicull man says you cant mix cucumburrs and milk and expect to live boys, well he's just about write to! Mac McDaniels and Swede Lindman are likely candidates for the nursus at St. Mary's but their luck wont last we hope.

Everybuddy rallied for a new leece on life when the ladees from the offic visited here tho. That Miss Melon made quiet a hit with us boys; she isnt married is she? Well, not for myself but Chuck Cross wants to know; he is the very devil with wimmin, and thinks she is Irish, too. It was also notissed that she wore red hair and a green bathing suit at our swiming pool which blended well against the ribes in the background and Iron Glasgows loud 2 peace soot. Take Miss Linch for a contrast - she was more orderlie altho she didnt go swiming so she is presumally the scotch type like Iron Glasgow, Brick MacCloud, and Miss MacWold is she knot? Looks are deceiving of corse as Larry Pence remarks when Phil strikes the rong cord on his banjo, but pursonally Miss Melon couldnt deceive no body whereas Miss Linch mite. She is a peach if her name were not otherwise, but I am afraid to complement any lady now since that last dance us boys attendid at Helmers.

Well as to news, the only news of interust I can think of is our golf turnament which Charlie Shiftner plays with rat traps and stove pipe bunkuurs. He plays the coarse at night by flashlite and has made every rat in par so far except his 18th which was extra tuff and called for 14 strokes with the stove pokur wich was quiet disturbing on the rest of the camp.

We are told to put out our lites at 10 o'clock and go to bed in silence but Al and Chuck and some of the others still persist in purjamas.

Hoping you are the same, I remain

Your respectfill reporter

Eddie Lacy

SAVENAC NURSERY NOTES

Harry F. Geil

A few notes and comments concerning the work here might be of interest because of the new and radical methods used to fight the Ribes.

In addition to dense concentrations of brush and Ribes, numerous beaver dams cause the water to overflow much of the area.

After a three seasons' struggle, using the generally accepted method of Ribes eradication, it was found that not enough protection was attained for a nursery raising white pine for reforestation, therefore it was thought advisable to try the method of clearing the area of all brush and trees. Although the expense per acre of this clearing will be high, the eradication of Ribes following will be much more efficient and permanent. There should be no "missed" bushes, sprouts and seedlings will be easy to find, Ribes seeds should all germinate the following season and be taken out later, beaver dams kept open to drain the area and grass seed sown which with pasturing should discourage and finally eliminate the Ribes entirely.

From the middle of May until the last of June, 26 men were cutting and piling brush, also taking out dense concentrations of Ribes.

A total of 59 acres was thus cleared. Some of the brush piles were burned during the early part of the season until the dry period made burning a hazard.

June 15, two crews of four men each were put on and on July 1 an additional crew of five men, making now thirteen men on eradication. It is expected that by the end of August every acre of stream type for a distance of one mile from the Nursery will have been carefully cleared of Ribes. The entire area is being hand pulled because of the abundance of R. inerme which, as yet, cannot be killed with chemicals.

To date we have eradicated 348 acres getting 115,730 Ribes.

The area on Big Creek and the St. Regis River where a broadcast burn was run last fall is showing an enormous crop of seedlings excepting in a few places where the burn was not enough to burn to the mineral soil.

BLISTER RUST CAMP 3 - STOCKING MEADOWS

Homer Hartman

Quality that you can see and appraise for yourself prevails throughout the Camp 3 as "Body by Fisher."

Although Camp 3 is only accessible by passage over forty miles of trail (not too level) it is getting its share of prosperity and improvement

which is becoming more prevalent each year in blister rust work.

Camp 3 was first located on Breakfast Creek one mile from its junction with the Little North Fork of the Clearwater River. While in this camp over 400 acres of stream type were eradicated; light concentrations of Ribes lacustre, R. inerme, and R. petiolare were present. This being the initial camp of the season, the new men were all initiated into the wild life of a "blister rust". All of the swampdogs, snipes, etc., were caught and put in their respective cages for the summer, also several axe handles were badly beaten about the head. It was at this time that Al Lanigan, our faithful cook, laid down the unwritten laws regarding actions in and around the cook shack.

During the month of July, Camp 3 was situated at Stocking Meadows on the head waters of Meadow Creek, also a tributary of the Little North Fork of the Clearwater River. While at Stocking Meadows over 800 acres of stream type were eradicated which required the extracting of some 340,000 Ribes. Medium concentrations of R. lacustre and R. petiolare were present. No chemical was used.

On August 1 Camp 3 moved to Cedar Creek, where some 9,000 acres are to be put under protection, which will have been completed by September 1.

The working of such large areas as those put under protection by many of the camps this year is only made possible by past experiments and research which has led to the present workable methods of eradication and camp facilities--let us ameliorate, cooperate and expand.

FILMING WILD LIFE IN THE CLEARWATER

E. E. Hubert, a Medicine Man of the Tribe

It is night and the shadows, deepening among the closely set trunks of stately trees, darken the trail until a sixth sense must be brought into play to keep on the narrow groove of earth as the "safari" of the Blister Rusters winds slowly down the last steep pitch to Eureka Meadows. Suddenly through the darkness ahead gleam the flames of many fires in a compound and the illuminated tents of a camp. Voices and the rattling of camp ware. Footsore but safely we have finally reached the famed camp of Bwana Heinrich in the heart of the Clearwater.

Unshouldering of packs - greetings - and then the courtesy of the Bwana's tent where we soon recline and ease our weary limbs on restful (?) beds. Tales of deep and impenetrable jungles and of thickets of alder filled with the dangerous Indian currant soon filled the air and the Poison Pumpers of the Blister Rust tribe begin to unfold their tales of adventure and progress. An epic of conquest! The saving of a mighty forest! All accomplished by the simple squirting of a mess of chemicals over bushes hidden in closely matted alder and willow clumps or the sturdy tug of many

bronzed backs glistening in the heat of the Clearwater. A life of action and adventure, of pleasures and of dangers! And with the recounting of dangers came slowly and unwillingly the most lurid tale of all, the raids of the night prowlers; of Maggie, the brown bear and of Blackie the Bold One, and of strange powers of man over beast. As the creepy tale unfolded, Bwana Heine rose grandly in the fervor of his telling and in the flickering light of the tent lamp summoned the Gun Bearer, Parks, to bring before us the evidence, and we gazed with fascinated wonder at the superhuman powers of the mighty hunter, Grizzly Ed, known to the tribe as King Cole. The evidence, though faint and blurred, was before us! Long into the night the tale unfolded and to us came faintly the night sounds of the camp, the hushed noises of the "safari" settling to a needed rest, the occasional splash of the beaver, the mournful cry of the night hawk or the blood-curdling wail of the coyote, the faint clash of kitchenware in the cook shack. Then quiet.

A shuddering crash of metal on metal resembling nothing less than the toppling over of a shelfful of milk pans or the upsetting of a pack string loaded with camp ware, broke upon the still night air. Blanched faces turned toward the cook shack listening, hardly daring to breathe. Was it another raid of the beasts who crushed out life by a hug? Were Maggie and Blackie returning for more victims? Suddenly the tension broke, the tent light flickered as a booming voice from the region of the cook shack across the compound broke rudely upon the night. "Hey, you Maggie, you dog-gone, gol-swiggled, ornery, old fool. Whatinell you doing in my cooler? Come out o'there afore I turn you hindsides foremost and inside out!" Breathing easily again we rushed out pellmell stumbling blindly toward the light in the cook shack. As we reached the mess tent our amazed eyes beheld the spectacle of Grizzly Ed, the cook, brandishing a Ribes pick in one hand, a Palouser light in the other and chasing a shadow into the black void of the forest.

With much noisy thrashing through underbrush and loud grumblings Grizzly returned to the friendly circle of light in the mess tent to explain that "that ornery critter, Maggie, was not satisfied to be fed out of my hand in the daytime until her sides stuck out but had to come sneaking around at night trying to cart away a slab of bacon. Yesser, I tamed 'em both, her and Blackie, to eat right out of my hand and Maggie, the old fool, even held my hand with her paw while I fed her scraps out of a lard bucket. Now I have to hang all the old skilletts, fry pans and broken down bread pans on strings around the place to keep those ornery cusses from eating me out of house and home". Grizzly cast a baleful eye into a dark corner and resumed. "Yesser, you can see her do her stunts tomorrow, and I'll call you when she shows up. She comes around regular, twice a day."

With this promise of a real adventure on the morrow and an opportunity for rare photography, we reluctantly and literally sank into the depths of a sapling bed and nightmare slumber, to awaken to the sounds of

great splashings as of huge beavers in the "safari" pond. But 'twas only the morning plunge of the Blister Rusters which shattered the early morning quiet of Eureka Meadows.

All of that weary day I trekked and back tracked, planning and shortening my trips into the forest so that I should not miss the one great adventure, Grizzly Ed feeding the wild bears of Eureka Meadows. As the sun blazed down from its high point in the sky, doubts began to assail me. But, had I not seen with my own eyes the films taken by those steel-hearted men of the woods who had braved the torrid heat and the dangerous rushes of Maggie and Blackie and who had sweltered patiently in their brush blind so that they could "camera" the camp raiders and their tamer, Grizzly Ed?

But as the shadows slowly began to lengthen again over the famous camp site my belief oozed out like melted butter through cheesecloth, for though Grizzly called coaxingly into the black depths of the forest, "Mag, here Mag" no sign or sound rewarded our patient vigil. With a heavy heart I again shouldered my pack and bidding farewell to the jovial and friendly crew I wearily followed Andy over the hump into Headquarters.

As I toiled up the trail two words kept crowding into my thoughts in time to my plodding footsteps - heat - films, heat- films - Suddenly, I stopped and checking Andy in his best Champs Elysees stride over the ridge ahead, I exclaimed, "Now, I know how they got the close-ups of the bears eating out of Grizzly's hand. Some rare wit in camp must have had an old bear skin - the terrific noon heat softened the films and blurred the pictures and there you have it all - the Ingagi of Eureka Meadows."

Dreaming Again

Hello,. Blister Rusters! Do you know that this summer is two-thirds gone? Well, it is, even if you hadn't thought of it. Will you all be glad to get back and see your grandmother, sister, or what-have-you? This is the time of the year when these infernally sticky Ribes bushes begin to lose their attraction for us. Aint it the truth? What do we care about a few Ribes petiolare, or R. lacustre, or R. irriguum or anything else that has anything to do with Blister Rusting? We all long to be back in the wide world again and do bigger things in a better way. What's that? The gong? OH! It's time to get up is it? And just as we were accomplishing great and wonderful things, too. But, then, we hired out to be tough and we're the kind that will be no matter where we are. After all, we're merely father Blister Rust's little boys. We must get up, work hard, and be good boys so we may grow up to be a big help to papa Blister Rust some day.

Kenneth Parks, Camp 1, Headquarters

CAMP 1'S PINE SONG, HEADQUARTERS
(To the tune of the "Stein Song.")

Fill your tank for Uncle Sam.
Pump till your backbone aches.
Stop and fill your tank once again,
Forgetting every ache and pain.
Look at all the Ribes there
Don't even miss a few.
Don't try spraying every alder -
It means a bawling out for you.

To the east, to the west
And in each draw and little stream
You'll find there petiolare
That will haunt you in every thought and dream.
To the youths--to the men
Who are working each day 'neath the sun
Will come pay for every day
For work that's been rendered and done--so

Fill your tank for Uncle Sam
Pump till your backbone aches.
Stop and fill your tank once again,
Forgetting every ache and pain.
Look at all the Ribes there
Don't even miss a few.
Don't try spraying every alder -
It means a bawling out for you.

Ernest Prescott.

SONG OF THE RIBES RUSTLER

(With apologies to Rudy Valee for using the tune of "The Vagabond Lover".)

Some Ribes are hard to discover.
They're small and they never are found.
But some you can catch
In one great big patch
That covers ten acres of ground.
For I'm just an old Ribes Rustler
In search of the weed I abhor.
But I know that next year
I'll be back again
For they always come back for some more.

Warren Starr.
Camp 3, Elk River

WHAT HO - GETTING TECHNICAL

The tendency nowadays is to classify things. To make it scientific, you know. So in my modest unassuming way I've made a little key to the pests that assail one in these wilds.

Two-Legged Pests.

- a. Camp bosses - rather inconsiderate, very easily recognized.
- b. Cooks - can be distinguished from above by white caps, always harping about boilers full of water.
- c. Foremen - embryonic camp bosses, much more personal in applying their venom.
- d. Camp mates - always out of something you've got. Whistle and sing when phonograph is playing.

Otherwise-Legged.

- a. Mosquitoes - now extinct.
- b. Flies - big ones, little ones, medium sized ones, green ones, ones that bite, ones that tickle, ones you can catch, ones you can't, and well, there's a lot more.

I refuse to put anything pertaining to camp four in my classification. It's too select for that. Besides they wouldn't fit in any classification. They're unique and several other things I can't say. They picked over our records and then abstracted our newspapers and magazines. If our pack train hadn't stopped going through there, they would have opened our letters and saved the best ones. In fact, as the saying goes, they beat a slaughter house for--ah--intestines.

Stocking Meadows, Camp 3,
Elk River.

A LITTLE HELP, PLEASE

Dear Editor:

How about scouting around a bit for a few medals for the poor devils that "lifted leather" for thirty or forty miles over a rough trail to the camps on the distant "Breakfast Creek"? They are the modern martyrs, working for a just cause. Chair bottom size preferred.

Yours truly,

A Social Worker.

And have you heard the new checkers' song? "I'm following you."

MAYBE HE DIDN'T LIKE IT

C. R. Quick reports two days' time spent on fire fighting duty, Stanislaus National Forest, on his weekly itinerary form, as follows:

July 30. - Fighting forest fire at request of Forest Service.

July 31. - Fighting forest fire at demand of Forest Service.

TOO MANY MILES

Have you ever stopped to realize the number of miles traveled during a summer in the blister rust camps for mail? If one is in love, he is apt to travel a total of 100 to 150 miles for his letters. Those are the only letters he is interested in. Others expect important letters, the importance depending upon the person, and will often walk ten miles after a day's work just to see if they are there. Imagine the remarks which would be passed were we obliged to walk even five miles after supper for anything but--the mail! Curiously enough, a letter from the "one and only" will heal any blisters incurred while on the trip. The next morning may find ungentlemanly remarks passed regarding the trips to and from work, and how they cause one to wear blisters on one's heels, but no mention will be made regarding last night's trip.

True valor in anyone can be found by his willingness to go for the mail, no matter what the pains may be.

Imagine the disaster should her letter remain in the post office one day longer! There is no doubt but "When bigger and better martyrs are made, women will make them."

The philosopher,
Camp 1, Headquarters.

SUGAR PINE AT THE SOUTH POLE

G. A. Root

The radio batteries carried by the Byrd Antarctic Expedition were protected by boxes made of sugar pine. The selection of this wood from a host of other species, speaks well for the particular properties for which it is noted. A wood, light in weight but strong, was needed as well as one possessing good thermal insulation. Weather conditions made it essential that a wood be selected which would not warp, twist or shrink. All these qualities seemed to be possessed by sugar pine.

Certainly a wood meeting such exacting conditions as are required by the severe elements of the Antarctic is worthy of perpetuation.

* * *

H. Miller Cowling joined the office July 1 as assistant in the educational department, photography being his major field of endeavor.

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W E S T E R N B L I S T E R R U S T

N E W S L E T T E R

* * *

Confidential

* * *

SOME REGIONAL COMPARISONS OF HAND ERADICATION OF RIBES

Ribes eradicators, using the hand pulling method, striving to protect Pinus Monticola and P. lambertiana from blister rust, removed 1,337,794 Ribes bushes from 5,825.7 acres of timber in Montana, Idaho, Washington and California during the month of August according to monthly reports from the eradication projects. Of this total Idaho was out in front with 1,019,301 bushes; Montana came next with 135,439; Washington third with 114,045 and California last with 69,009. Be it said for California that the entire job there was re-eradication which, of course, accounts for it being in last place.

Taking the Idaho totals by districts we find the Potlatch Timber Protective Association leading with 528,755 Ribes removed from 1,663 acres for an average of 317.9 bushes per acre, the Clearwater Timber Protective Association pulled a total of 246,576 bushes from 1.028 acres to average 239.8 bushes per acre; while on the Clearwater National Forest 243,970 bushes were pulled from 786 acres, making an average of 310.3 bushes per acre.

Two of the four Potlatch camps sprayed in stream type while all of the Clearwater Timber Protective Association and Clearwater National Forest stream type was sprayed. Practically all of the Rainier job was stream type and all hand pulled while the Savenac Nursery job was re-eradication of sprayed and hand pulled areas, all in stream type, and California was re-eradication of hand pulled areas in both stream and upland types.

The Rainier National Park job showed the highest average per acre with 651 bushes per acre on 175.2 acres; the Savenac Nursery job in Montana came second in that respect, showing 482.48 bushes per acre on 112.5 acres. California had the lowest average per acre with 43.43 but was second in acreage with 1,589.

Leaving the Savenac Nursery and California jobs out of consideration, as both were re-eradication jobs, we find 1,214,505 Ribes pulled from 4,124.2 acres for an average of 294.5 Ribes per acre, indicating that the Clearwater National Forest presents the nearest to average conditions, as far as hand pulled areas are concerned, with the Potlatch Timber Protective Association second, both having slightly more than the average number of Ribes per acre, while the Clearwater Timber Protective Association has fewer than the average. The State-Federal job in Montana is the lowest of areas being worked for the first time, having only 171.9 bushes per acre. The Savenac Nursery presents an interesting picture in the light of the average figure for new work. That job is being worked for the third time and yet 482.48 bushes per acre are reported from there while the average for new work is only 294.5.

In all of the figures quoted the size of bushes is disregarded, due to the fact that feet of live stem was not given except for California.

The 69,009 bushes pulled in California had an average of 2.8 feet of live stem or 121.66 feet of live stem per acre on the 1,589 acres covered.

TABLE NO. 1

TOTAL HAND PULLED RIBES AND PER ACRE AVERAGES FOR
AUGUST, 1930

Montana

Area	Acres	Ribes Per Acre	Total Ribes
State and Federal*	472	171.9	81,160
Savenac Nursery (Re-erad.)	112.5	482.48	54,279

*June 16 to August 22.

Idaho

Area	Camp	Acres	Ribes Per Acre	Total Ribes
Potlatch Timber Protective Association	1	468	274	128,232
	2	204	255	52,020
	3	702	361	253,422
	4	289	329	95,081
	Totals	1,663	317.9	528,755
Clearwater Timber Protective Association	1	414	147	60,858
	2	267	187	49,929
	3	260	279	72,540
	4	87	727	53,249
	Totals	1,028	239.85	246,576
Clearwater National Forest	Methods	215	234	50,310
	1	159	248	39,432
	2	124	331	41,044
	3	288	393	113,184
	Totals	786	310.3	243,970

Washington

Area	Acres	Ribes Per Acre	Total Ribes
Mt. Rainier Nat. Park	175.2	651	114,045

California

Stanislaus National Forest

Acres	Ribes Per Acre	Total Ribes
1,589	43.43	69,009

Ribes	Ft. L. S. Per Bush	Ft. Live Stem
69,009	2.8	193,320

Acres	L. S. Per Acre	Live Stem
1,589	121.66	193,320

Idaho was the only state being considered in this article where chemical eradication was done. In the three regions the Ribes on 967 acres

were sprayed using 31,246 gallons of spray for an average of 32.31 gallons per acre. Of all the camps the methods camp had the largest acreage, 198, and the most gallons sprayed, 6,534. That camp used the power spraying method along with knapsack sprayers, while all other camps used knapsacks only.

TABLE NO. 2

Chemical Eradication				
Area	Camp	Acres	Gals. Spray	Gals. per Acre
Potlatch Timber Protective Ass'n.	1	130	4,810	37
	2	159	3,021	19
	Totals	289	7,831	27
Clearwater Timber Protective Ass'n.	1	19	1,121	59
	2	53	2,279	43
	3	12	612	51
	4	71	1,562	22
	Totals	155	5,574	36
Clearwater National Forest	Methods	198	6,534	33
	1	128	5,760	45
	2	91	3,003	33
	3	106	2,544	24
	Totals	523	17,841	34
Average for three jobs		967	31,246	32.31

Totaling the hand pulled and sprayed jobs, we have 4,444 acres covered in Idaho. The following table gives the acreage by regions.

Total in Idaho Sprayed and Pulled by Regions

Area	Hand Pulled	Sprayed	Total
Potlatch Timber Protective Ass'n.	1,663	289	1,952
Clearwater Timber Protective Ass'n.	1,028	155	1,183
Clearwater National Forest	786	523	1,309
Totals	3,477	967	4,444

In Idaho approximately 145,000 acres of white pine timber had been partially protected up to August 31. This is 1930 work only and does not include the areas partially protected in former years. The Potlatch Timber Protective Association leads with 62,000 acres, the Clearwater Timber Protective Association is next with 43,000 acres and the Clearwater National Forest last with 40,000 acres.

RIBES ERADICATION ON MT. RAINIER NATIONAL PARK

M. C. Riley

During the month of August eradication was completed on Nisqually River and all of its tributaries with the exception of Paradise Creek. Some of the areas in the Silver Forest containing heavy concentrations of the most susceptible Ribes species were eradicated as was also an especially bad area west of the road leading from the glacier bridge to Ricksecker Point.

A total of 114,045 bushes was pulled of which 59% was R. lacustre, 25% R. bracteosum, 15% R. laxiflorum and 1% was R. acerifolium. The time spent in actual eradication was 413 man days.

The area eradicated was classed as follows:

Class	Acres	Cost Per Acre	% Total Area
M	4.0	\$58.87	2
D	23.8	\$26.90	14
C	114.3	\$15.67	65
B	33.1	\$4.04	19
Totals	175.2		100

It was possible to work only five days in September and during this time the work was concentrated on Paradise Creek which was completed up to Narada Falls.

An exceptionally bad area at the base of Narada Falls was eradicated immediately after the Labor Day rush of travel. Each year this area is visited by a large number of tourists who desire to take pictures of the falls. Consequently it was thought best to postpone working here until after heavy travel had ceased. It is hoped that new vegetation will replace the pulled bushes before the next travel season. There was no place to hang bushes on this area so a rack was built of dead poles, the bushes were pulled up the steep hill with ropes and then piled on the rack.

During the five days worked in September there were 14,501 bushes pulled of which 15.7% was R. lacustre, 81.1% R. bracteosum and 3.2% R. acerifolium.

The area eradicated in September was classed as follows:

Class	Acres	Cost Per Acre	% Total Area
M	.3	\$86.66	1.0
D	3.3	\$35.26	10.1
C	24.0	\$7.36	73.6
B	5.0	\$2.63	15.3
Total	32.6		100.0

BELIEVE IT OR NOT
M. C. Riley

In connection with Ribes eradication on Mount Rainier National Park, several new problems were encountered, among them being the removal of pulled bushes from roadsides, taking out string line, removing rocks which were accidentally rolled into the road, patrolling the road to keep tourists from throwing rocks down over cliffs onto men working below and using ropes in steep country and cliffs where men could not get a foot-hold.

Much of the work was done along streams which had their origin in glaciers and the large amount of sand and pumice deposited on the small flats adjoining the stream beds made pulling exceedingly difficult. In many cases the root crown would be buried at least $1\frac{1}{2}$ feet in wet sand, so the roots had to be "gophered" out. It was found that the most practical way to remove Ribes laxiflorum, which occurred in dense trailing masses on these flats, was to actually dig a furrow and take out all roots encountered. Then another furrow was dug parallel to the first one which would hold the sand taken from its newly constructed neighbor. In this way it was possible to remove the sand without covering up more Ribes.

Late in the season some Ribes tools of special California design were secured and for ordinary work these were satisfactory, but in addition to these, use was found for trench and miners' picks, mattocks, grub hoes, long-handled shovels, axes, cross-cut saws and peavies.

New problems were also encountered in the disposal of pulled bushes in order that they would dry out properly. As was noted in a previous report, it was necessary on several occasions to pile R. bracteosum on the ground and when the top of the pile was dead the pile was turned over so the bottom would die. At the foot of Narada Falls even this method was not practical because the area could not be worked until late in the season, and there was no place to pile the bushes because of steep country, trails and streams. Practically all of this heavy concentration was subject to continual spray from the falls. Consequently a rack was built on higher ground which was more nearly level and the Ribes were pulled up the hill by means of ropes and were then piled in the rack to dry out. It is the plan of the Park officials to scatter the dead bushes over the adjoining area next spring and they anticipate that the new vegetation will cover up the dead bushes.

Approximately 3,400 bushes were piled into the rack which was 40 feet long, 20 feet wide and 15 feet high. It required practically as much time to collect dead material for building the rack and for pulling the bushes up the hill as was required for actual eradication.

GIVE BLISTER RUST DEMONSTRATION

A white pine blister rust demonstration was given September 18, 19 and 20 at the Clearwater County Fair at Orofino, Idaho.

A special set of lantern slides, dealing with control work in Clearwater County, was used and attracted considerable attention. The re-

mainder of the material, especially the fruiting cankers, also proved interesting to the visitors.

The educational work done at the same fair in 1929 apparently spread much information for a large percentage of the people showed some knowledge of blister rust.

SOUNDS LIKE A PICNIC

Corvallis, Ore. 7/25/30
Pacific Tel. & Tel.

WALTER T LUND
SWIM OREGON

MEET ME SWIM TOMORROW MORNING WITH ENTIRE CREW STOP BRING
LUNCHES

GOODDING

GOVT RATE *CHARGE*
264-m

* * *

Mr. S. B. Detwiler and Mr. G. B. Posey, of the Washington Office, arrived in the West during the latter part of August and have been inspecting the field work in this region. A short trip was made to Haugan to see the work at the Savenac Nursery. Following this they spent a week in the Idaho eradication camps, during which time they were joined by Mr. R. N. Chipman and Mr. C. B. Ahlson, of the Chipman Chemical Engineering Company. Following their inspection of the Idaho work a short trip was made to the California eradication camp on the Stanislaus National Forest. Mr. Detwiler and Mr. Posey are now on the Coast looking over conditions at Daisy Lake and Cheekye, B. C., Bremerton and Mount Rainier, Washington.



October, 1930

WESTERN BLISTER RUST

NEWS LETTER

* * *
Confidential
* * *

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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister Rust Control
Spokane, Washington

NEW OREGON INFECTION

The most southerly pine infection in the West was found by Eldon Lyle in September in the Marion Lake region of the Santiam National Forest, southwest of Mount Jefferson, in Oregon; according to reports from L. N. Goodding.

Goodding has the following to say of the infection:

"Lyle and I spent Saturday, October 11, in the Marion Lake region; to be exact in the Marion Creek section along the trail from Detroit to the Independence Ranger Station and a couple of miles beyond. This is the locality referred to in my last month's report, where Lyle found pine infection. Scattering blister rust was found on pines for four or five miles in several places quite isolated from Ribes, leading to the conviction that a much heavier infection existed in the region. On the return trip, we discovered at least one spot of this heavy infection. At the base of a rock slide, or talus slope below a cliff, we spotted as heavy an infection as I have seen. One tree about forty feet high is plastered from top to bottom, certainly bearing several hundred cankers. Needless to say, we have not made an exhaustive study of this region as we went into it for a single day's trip. It is plainly evident, however, that the infection struck the region not later than 1923 as there are several cankers we observed to be on 1921 wood. The guilty Ribes is undoubtedly Ribes sanguineum."

ATLACIDE AS A POISON TO GAME

B. A. Anderson

At the beginning of the field season two dead elk were found on Deer Creek in the Clearwater Association area. When the elk were found they were still warm with no signs of bullet wounds on their bodies. The carcasses were within three or four hundred yards of a last season's chemical filling station. An inspection of practically all old filling stations showed that about 10% of them had been trampled and pawed by deer, indicating that the stations may have been used as licks. At one station a sealed container with several pounds of chemical still in it was found. The can had been pierced in three or four places by bullets and a little of the chemical may have leaked out. It was unfortunate that the stomachs of the animals were not removed for examination.

While the close proximity of the bodies to the filling station looks exceedingly suspicious, I doubt very much that they were killed by Atlacide. Experiments carried out in the laboratories at the University of Idaho disclose the fact that four ounces of the chemical are required to kill a sheep. A dense concentration of black currants sprayed in the Potlatch area was stripped of all foliage by a band of sheep while the spray was still damp on the leaves of the bushes and not a sheep showed any ill effects. The only ill effects were exhibited by the foreman of the Ribes crew that had sprayed the area as he watched the sheep stripping

the stems. However, he had followed instructions given him by his project leader to leave no quantities of chemical in a position where stock could get at it. At that time the Idaho experiments had not been made and the stock angle of the spray was being closely watched.

Another reason for believing that the elk were not killed by the chemical is that wild game seldom if ever lick loose salt. Instead they trample it into the ground and lick the dirt or chew on logs, etc., that have been soaked with a saline solution. It is not an uncommon sight to see almost an entire log at a deer lick chewed to pieces. Dynamite wrappers account for the death of considerable game. If it takes as large a quantity of Atlacide to kill an elk as it does to kill a sheep, then verily an elk gets his peck of dirt a day because it is practically only as a mixture of salt and dirt that deer and elk secure their supply of salt.

There is, however, a possibility that the chemical and the tin container may react to form a poisonous compound which would prove fatal to an elk. That, however, is only a supposition - the surest way to ascertain whether or not Atlacide is fatal to game is to have the stomach of any dead deer or elk found in a sprayed area sent in for examination. After two years of chemical eradication in the Clearwater country, no more dead game has been found than before blister rust operations commenced.

Heretofore empty chemical cans have been sealed and tossed aside. After discussing the problem with the deputy state game commissioner, it was decided to leave the empties unsealed and toss them into the creeks to avoid the possibility of leaving partly filled cans in the brush.

BLISTER RUST CONTROL ON THE LANDS OF THE POTLATCH TIMBER
PROTECTIVE ASSOCIATION, 1930
W. G. Guernsey

Stream type eradication was continued on the Potlatch Association white pine lands during the past season. Approximately seventy men were engaged in hand pulling and spraying Ribes to assist in partial protection from blister rust on 165,003 acres. There were 6,086.5 acres of stream type covered by hand pulling methods and 308 acres covered by the chemical knapsack spray method.

The average cost for this partial protection amounted to \$0.18 per acre.

Considerable experience was obtained during the season in moving camps, supplies and equipment far from a central base. Pack strings were a

necessity to move the necessary supplies and equipment from twenty-seven to forty-two miles from our base of operations at Elk River, Idaho. It is the common belief that eradication of currants and gooseberries has never been carried on over such an extended territory heretofore. But this will be of common occurrence in carrying on the work in the West in the future.

A very satisfactory year was experienced in regard to fire conditions and rain. No men were on fire until after the field season was over and only two days were lost by rainy weather.

HOW MANY SUPERVISORS?

C. C. Strong

In the early years of blister rust control in the West, when Ribes eradication was a purely experimental issue, permanent employees of the Office of Blister Rust Control, Western Branch, found no difficulty in keeping themselves effectively engaged upon various phases of the many problems which presented themselves for solution. Each field operation was essentially an experimental project determining the efficacy of varied control practices and finally feeding proven control methods into a general pot for use in the building of a specific practical blister rust control program. During a relatively short field season enough field data were secured to keep the old mill grinding steadily until the next field season rolled around. This continuous process of amalgamating proven practices finally resulted in a practical method of controlling blister rust in the West.

Throughout the period of development of the control program necessarily all hands and the cook had a finger in the pie. Now, with the control program ready for practical use, it was obvious that some one familiar with it had to put it into effect. Furthermore, the time had come when there had to be a distinct parting of the ways. It was necessary that some of the permanent personnel concern themselves with keeping the now full grown puppy on the right path while on the shoulders of the balance fell the duties of further development of methods, equipment, etc. This parting of the ways marks one of the most important milestones in the putting into effect of the control program.

The successful application of blister rust control, more especially in the Inland Empire, has resulted in securing a constant growth in confidence of white pine owners. The further result is that the blister rust control organization has, year by year, been called upon to assume greater and greater responsibility in supervision and actual field management of growing practical blister rust control projects. At the present time it is necessary to maintain a permanent force of four or five trained men as a supervisory nucleus to handle these practical undertakings. The

rapid advent of the rust into the Inland Empire forces a decision in the near future as to the policy which will be followed in considering blister rust control. Either pine owners stand to lose heavily in white pine, both for the present and the future, or they must decide in favor of a greatly enlarged blister rust control program. In the latter event whoever administers such work, for it is from a going operation only that trained supervisors can be secured, will find himself face to face with the desirability of a decided increase in permanent personnel. The only logical assumption which can be drawn, for the present at least, is that the Western Branch Office of Blister Rust Control must supply that supervision.

Consideration of an increase in the permanent personnel of the Ribes eradication project brings home the problem of effectively employing these men during the off season. It has often been demonstrated that practical field administrators are not efficient experimenters or researchers. At best the field season on blister rust control can not be extended over six months. This leaves an equal period during which there appears a dearth of useful employment. What would be done with these men? For the most part they would be foresters. The only type of men who can be considered for full time employment are those who get things done. Naturally men of this type are not going to be content to twiddle their thumbs from the end of one field season to the beginning of the next. Neither would it be good economy nor good business practice to employ these men at manual labor at the warehouse.

This impending employment problem has been mentioned frequently by the writer and others and as frequently discussed but with no solution in sight. Additions to the permanent personnel must have useful employment which will offer an opportunity to each man to grow with his profession. Until such employment can be offered the only solution is that there be no appreciable increase in the permanent personnel. In the latter event somewhat of a chance must be taken on being able to lure back each season a large number of seasoned veterans to supervise Ribes eradication units.

DEVELOPMENT OF BLISTER RUST ON RIBES LEAVES AFTER REMOVAL FROM BUSHES

That blister rust will continue to develop on Ribes leaves after the leaves have been removed from the bushes, has been rather impressively shown during the past summer.

In June, two large plant presses were filled with infected leaves of Ribes bracteosum collected on the Paschall ranch infection area near Bremerton, Washington. At the time the leaves were collected the rust was in the uredinial stage with but one or two small spots of telia. When the presses were opened in October and the specimens removed it was found that

fully 95 per cent of the specimens had developed from the uredinial stage to the telial stage and every leaf in the collection had some telia on it.

This is the writer's first experience with this condition and consequently no reason is forthcoming as to why this should be. The theory the writer advances is that the blotters, in removing the moisture from the leaf, kept that moisture in sufficient amount to permit the rust to feed on the food in the leaf until full development was reached.

If any of the readers of the News Letter have had experience with this problem the editor would welcome any information on the subject.

PRE-ERADICATION ON MT. RAINIER NATIONAL PARK

M. C. Riley

During the course of the 1930 field season, the representatives of the Office of Blister Rust Control were asked by the Park Service to examine other areas containing white pine in Rainier National Park and to give their technical recommendations regarding the advisability and cost of blister rust control.

This pre-eradication survey was conducted during the latter part of the field season and continued after the work of eradication was over. It consisted of the examination of eight different areas. Six of these areas, namely: Emerald Ridge, Longwire-Silver Forest, Mowich River, Muddy Fork of Cowlitz River, Rampart Ridge and White River-Yakima Park were considered as warranting protection. The other two areas were so situated that eradication costs were prohibitive.

The areas examined do not constitute the total white-pine area in Mt. Rainier National Park but were the areas where the most white pine was known to exist and were located where the effects of blister rust would be most noticeable to the touring public.

The Longwire-Silver Forest area would be an extension of the work done during the past field season and all of the others would be new areas. Ribes lacustre and R. laxiflorum are numerous in the stream type on all of the areas and R. bracteosum is common on all except the Emerald Ridge and White River areas. Eradication would be for the protection of P. monticola on all areas except Yakima Park where P. albicaulis occurs in large numbers. The only Ribes found in association with P. albicaulis was R. acerifolium.

All units are comparatively accessible and it will only be necessary to construct approximately two miles of trail to reach all of the camps. Location of camp sites is made a rather important problem

in some instances because many of the streams have their origin in glaciers.

If all areas included in the pre-eradication survey were worked in one year it would require approximately 80 temporary men.

OUR DARK ROOM

The Spokane Office now has its own photographic dark room. For several years a dark room has been talked of as a means of saving considerable money and also as a source of superior results along photographic lines. Talk crystallized into action and the idea became a reality on July 1, when work was started to transform one of the small offices into a dark room.

Since the start in midsummer, much work has been done both by the project leader and H. M. Cowling and the dark room is now about completed. To cut down the cost of getting the project in operation much of the equipment was built here at the office. In addition to the equipment which was made up here, all material was installed by us except for the plumbing work on the large sink.

We now have two automatic printers, one for 5x7 and smaller pictures, and the other for 9x11 and 8x10. The smaller of the two was purchased at a low figure, about 6% of the original purchase price, and serviced here so now it works perfectly. The larger machine was built here, only the fixtures being purchased. The one article yet to be put on the printer is on order and should be installed within two weeks. When completed the printer will cost this office less than \$20 while the same machine if bought on the open market would cost \$200.

When this machine is completed we will be equipped to make contact prints from the smallest up to 9x11 in size. The only line of printing we will not do is making prints on positive film from motion picture negatives.

An enlarging camera with a reducing attachment has been ordered and will be installed within two weeks. When that is installed we will be able to make enlargements up to 20x28 inches and also to make lantern slides. Both of us are able to tint pictures and color lantern slides. The coloring of lantern slides is a slow process and so a large volume of this work cannot be attempted but we hope to care for the needs of the office in that respect. We also will make and color all enlargements used by the Western Office.

It is expected that all official photographic work of the western states will be done at this office. During the last three months we have developed everything from motion picture film to film for the

large aerial cameras. Much more attention can be given films here than any commercial studio can give. For instance, when films are under or over exposed we do not throw them away as is done in commercial shops; instead we intensify or reduce them, thereby making printable negatives out of shots that would otherwise find the waste basket. That point is an important one in the work of this office as many pictures are taken at remote points and if it were necessary to go back and take them over, the cost would be prohibitive. Of course, if the negative is too badly mistimed, nothing can save it.

Much of the work during the winter will be copying maps and tables, particularly for the annual report. Much care should be used in preparation of material to be copied. Maps should always be lettered with the Wrico lettering sets, not because hand lettering is not good, but because no one can apply ink evenly when lettering by hand. Also, no one can look at a lettering job and say that the ink is on evenly. The human eye cannot detect the light and dark spots but the camera can and does; so much so that much of the lettering is very light and some is lost entirely. A memorandum is being sent out with specific instructions in regard to the preparation of material for photographing.

Any particular problems anyone has which come under the head of photography will be cheerfully tackled here. If you have anything you want photographed or copied, do not hesitate to send it to us. If it can be done we will do it and if not, we will tell you so. George Root recently asked if pictures could be made of newspaper cuts suitable for making lantern slides. At the moment we have to confess that we do not know, but we will experiment and find out. The result will depend largely on the quality of the cut we have to work with.

Let me say in closing that this office is ready and willing to tackle anything in the official photographic line at any time for the personnel of the Western Office.

CALIFORNIA APPARENTLY FREE OF BLISTER RUST

A recent inspection of blister rust hosts in Del Norte and Siskiyou counties conducted by four members of the blister rust personnel failed to reveal any signs of the rust. Due to the fact that the disease was found in southwestern Oregon in 1929, fear was entertained that it might spread south to California this year. What next year will bring is problematical.

* * * * *

Messrs. J. H. Foster and F. W. Besley, State Foresters of New Hampshire and Maryland respectively, were in Spokane on October 14. They had been attending a series of forestry meetings on the Coast. The office availed themselves of the opportunity to show them some fine white pine reproduction and mature stands of white pine in the vicinity of the Elk River blister rust camps on the Potlatch Timber Protective Association.





November, 1930

W E S T E R N B L I S T E R R U S TN E W S L E T T E R

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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister Rust Control
Spokane, Washington

ELIMINATION OF BRUSH BY REPLACEMENT

C. H. Johnson

An article in the May 15 News Letter (Clearing and Burning vs. Hand-pulling) drew some constructive and encouraging comments. It is hoped that the following article will result in considerable backfire.

Up to the present three methods of eradicating Ribes have been practiced, viz.: hand pulling, application of chemicals and burning. It is yet too early to determine under what conditions each is the most practical and effective as all have their advantages as well as their disadvantages. Our present methods give only temporary relief and over a period of time are expensive and to that extent are inefficient. If our program is merely to retard or slow down the spread of blister rust, then we have indeed made quite remarkable progress, but if we are compelled to repeat the process we must by force of necessity make our work more permanent and less exacting. So far we have been merely suppressing Ribes; the next step is to make it impossible for regrowth of Ribes.

Brushy areas such as are found along our streams whether hand-pulled, cut, sprayed or burned will reproduce their kind unless checked. If Ribes bushes are destroyed we cannot depend on nature entirely to return some more desirable species to aid us from a protection standpoint. We can, however, plant what we wish to grow and rely on competition to aid us in our struggle against Ribes. Brush will not readily grow on a well grazed or properly cared for meadow and by proper spacing in tree planting operations the ground thereafter can be made automatically free of undesirable weeds and brush.

The chief argument against the removal of brush appears to be an initial cost so high as to make this method seem impractical; however, if we can agree that the formation of the turf, or a planting operation, is a move in the proper direction we need not be too concerned at present over the initial cost, because there is every reason to believe that Ribes replacement methods can be made cheaper than periodic Ribes eradication.

An effective spray which will kill brush and prevent sprouting can immediately reduce the cost of brush removal 75% and leave ample room for further cost reduction.

A turf may be established without the necessity of handling the brush as follows: spray all brush necessary. The following spring sow whatever grass is desirable to form a turf. If the general region is frequented by moderate snowfall the dead brush will be crushed to the ground and deteriorate. In dense, brushy areas with a heavy understory of Ribes and allied species there exists the possibility of burning by raising the inflammability of the brush with the highly inflammable NaClO_3 (or a cheaper substitute) and burning before or after the fire season

as soon as the chemical will ignite. Burning before and after the fire season is safe and the fact that burning is confined to moist locations offers an additional safety factor. Firing can be safely conducted during the fire season providing the necessary precautions are exercised, such as assembling pumps and hose and burning at a period when the wind has ceased blowing, generally towards evening. Under these conditions firing can be reduced to a safe hazard since the when, where and how of the fire are all pre-determined.

Another method of eliminating brush, but which may sound rather fantastical, is by creating Ribes-free areas along streams by planting coniferous species which are adaptable to moist locations. It must be common knowledge that along streams where a cluster of spruce trees occur no brush grows and the ground is covered with a mantle of dry needles or leaves. Under such a method the true meaning of forestry would be adhered to in every respect. Watersheds would be better protected and scenic values and wild life preserved. When our children or children's children attempt to control blister rust they will undoubtedly be hitting along such lines.

At the Savenac Nursery the method of supplanting willow and Ribes with grass has been tried on a small scale and proven successful. The only expense to date has been the cost of spraying and sowing a few ounces of seed. It is anticipated that not a single Ribes bush will ever need to be hand pulled or sprayed hereafter where before only Ribes grew.

In 1929, a dense cluster of Salix (willow) with a dense under-story of R. inerme was sprayed and later burned. On April 16, 1930 grass seed was sown. A good catch of grass was secured; sprouting with the grass were thousands of R. inerme seedlings, clusters ranging in numbers from ten to twenty-five per square inch were common. In July, R. inerme and grass were doing nicely. By mid-August all clusters of R. inerme had disappeared. On October 6, the plot was carefully examined for Ribes and the location of each was marked by a stake. A count revealed a total of 19 Ribes and 9 of the 19 were found at the base of willow trunks where the grass had not yet spread (size of plot circular and approximately 26 feet in diameter). A number of the Ribes appeared so weak that it is doubtful whether they will survive the winter.

It is felt that if as much time were devoted to brush suppression as is now given to other field experiments we would soon be crowding Ribes from the stream bottoms.

COMMENT

S. N. Wyckoff

Johnson's article on brush replacement gives an excellent idea of some of the practical possibilities existing in a new and as

yet unexplored field of Ribes eradication. The idea is of special value in future stream type Ribes eradication operations.

In a recent article by T. D. Woodbury, in the Journal of Forestry, the important and seldom recognized point is made that blister rust control work is almost unique in forest disease or insect control operations because it does not involve destruction of at least a small part of the thing it is designed to protect. The basis of the plan described by Johnson is in full accord with this idea, and, in fact, becomes an actually constructive measure in another way. Brush land is useless land; meadow has a very definite value for grazing purposes. Any blister rust control operation which can convert a valueless brush-covered area into useful grazing land has doubly justified itself.

SOME RESULTS OF THE RIBES RE-ERADICATION STUDY IN
CALIFORNIA, 1930
T. H. Harris

It was with more than common interest that we began the first re-eradication of Ribes on the experimental areas in California. Four summers had been spent in the initial suppression of bushes in several of the sugar pine regions of the state, and now we were to see how far those first attempts had taken us on the way toward adequate control.

The Strawberry areas on the Stanislaus National Forest, the scene of the first eradication work, were calling for a reduction in their on-coming Ribes flora. They include 6,670 acres in two contiguous units, one eradicated of Ribes in 1926 and the other in 1927.

The results of the re-eradication work given here are an average of the two units. 5,825 acres were covered by re-eradication crews, practically all of which is cut-over land of the sugar pine-fir and sugar pine-yellow pine types, and including, of course, stream type.

Re-eradication was accomplished with one 15-man unit working 722 man-days, whereas the original job took two camps of 20 and 22 men each, putting in a total of approximately 2,100 man-days (making allowance for the difference in acreage of the jobs). An encouraging comparison!

The total bushes pulled numbered 180,909 (see accompanying table) with 1,004,767 feet of live stem. Of this number it is significant that 88 per cent are seedlings having 60 per cent of the live stem. Upon a per acre basis 27.4 out of 31 Ribes are seedlings. This leaves 3.6 bushes to be divided between sprouts and misses, which is a trifle low due to accumulating errors in the data. Though the number of missed bushes is a small fraction (13 per acre) of the total bushes pulled, this number accounts for

24 per cent of the live stem. The size of the individual missed Ribes is thus seen to be 31.5 feet of live stem as against 3.7 for seedlings and 12.0 for sprouts.

The first eradication showed 59 Ribes per acre and a rough total of 340,000 bushes. Re-eradication gave 31 per acre with 173 feet of live stem per acre, and a total of 180,909 bushes pulled. 39 per cent of the Ribes were in stream type, composing 8 per cent of the acres covered. The remaining 61 per cent were in hillside types.

The prospects for cost reduction are bright. In 1926 the cost per average acre was \$2.22, and in 1927 it was \$2.00. Indications are that re-eradication costs will be slightly less than one dollar per acre. What might one predict for the third covering of the ground?

From this brief survey of the summer's work, what at first appeared to be a somewhat discouraging situation now is seen freed from the cloud of uncertainty and presenting a picture of clear possibilities that urges us on to more and better work. Myriads of Ribes simmer down to a paltry hundred thousand or so, the majority of which are seedlings of small size concentrated along streams to no small degree. On to the battle!!

SOME DATA ON RE-ERADICATION
STANISLAUS NATIONAL FOREST, CALIFORNIA, 1930

Ribes Class	Total Bushes Pulled	*Total F.L.S.	Ribes Per Acre	F.L.S. Per Acre	F.L.S. in Average Bush	Percentage of Total	
						Bushes	F.L.S.
Seedlings	159,572	598,284	27.4	103	3.7	88.2	59.5
Sprouts	13,581	162,733	2.3	28	12.0	7.5	16.2
Missed	7,749	243,750	1.3	42	31.5	4.3	24.3
Totals and Averages	180,909	1,004,767	31.0	173	5.6	100.0	100.0

*Feet of live stem.
5,825 acres covered.

STANDARDIZING OUR KITCHEN EQUIPMENT
B. A. Anderson

On June 24, our first camp move on the Clearwater Association was made from the North Fork of Reed's Creek to Eureka Meadows. Naturally it rained and we experienced the usual discomforts of tramping along slippery, muddy trails with streams of water flowing down the backs of our necks and into our boots to finally ooze over the tops

with a gurgling squish at every step: even the mules groaned under the added weight of wet canvas.

As the kitchen equipment was packed my heart sank at the motly collection of misfit kettles, pans, buckets, and odds and ends that were included in the heap. It was a heap such as would drive many a nail-chewing cargoeer to tears. That's three stages beyond "five minutes without a stop" profanity. And yet, every piece of equipment was in good condition and of good quality.

The regulation Forest Service 25-man kitchen outfit is packed in a wash boiler and one box about $2\frac{1}{2}$ feet wide, 3 feet long and $1\frac{1}{2}$ feet high--one mule load. It would necessitate an exhibition of Machiavellian strategy to squeeze our fifteen-man outfit on four mules.

I don't believe it is really anyone's fault that our kitchen equipment is so bulky and unwieldly. The years have gradually seen an increase in blister rust work and as the work increased and various sized units were sent into the field they were outfitted from the stock on hand and fill-in orders for odds and ends were supplied from the central office or by purchase made directly in the field.

But we're out of our teens now. Shouldn't we start thinking about standardizing our field equipment? Next year when the camps are outfitted, why not outfit every additional unit with compact, nesting kitchen equipment similar to the Forest Service units? Our needs are somewhat different from those of the Forest Service so of course minor changes would be necessary.

A 15-man unit will move from two to three times in a season. When a camp moves "mule space" is at a premium. It is going to ease the burdens of the field men a great deal, to say nothing of time and money saved, to have our equipment standardized. "More blankets, grub and Sibleys on the first string load so that the men will be comfortable in their new camp the first night" is our motto. Down in the Clearwater we are all for making our equipment look less like the heap which can only be duplicated in the "Land Where Lost Things Go".

SOME INSECT PESTS OF CURRANTS AND GOOSEBERRIES

G. A. Root

To have a working knowledge of the insect pests and plant diseases which attack 5-needled pines is of considerable importance, if not quite a necessity. More than once has the way been paved for a favorable reaction on the part of pine owners, when the inspector was conversant with and able to identify pine pests other than blister rust.

To a less extent has been the case with currants and gooseberries. (This more in the past when the black currant work was under

way.) If it is not of particular importance in conducting the usual activities of the blister rust program at present, it may be of general interest to some to scan the large number of insect pests to which the genus Ribes is heir. With this thought in mind the writer has endeavored to compile such a list. It is not necessarily complete nor do all the insects have Ribes as their only host.

THE LIST SEGREGATED ACCORDING TO ORDERS

Arachnida (spiders)

Common Red Spider
The Currant Gall Mite
The Pacific Mite

Thysanoptera (thrips)

*Currant Thrips
Pear Thrips
Antecedent Thrips

Hemiptera (true bugs)

Rose Leaf Hopper
Grape Leaf Hopper
Knotweed Psyllid
Currant Psyllid
Wild Rose Aphis
*Currant Aphis
Dogwood or Sunflower Aphis
Woolly Apple Aphis
*Gooseberry Aphis
Cottony Maple Scale
Brown Apricot Scale
Italian Pear Scale
Peach Scale
Putnam's Scale
Ivy or Oleander Scale
San Jose Scale
Oyster Shell Scale
The Ground Mealy Bug
Snowberry Whitefly

Coleoptera (beetles)

Flat-headed Apple Borer
Western Apple Borer
*Black Gooseberry Borer
Branch and Twig Borer
Western Fruit Beetle
Common June Beetle
Fullers Rose Weevil
Currant Fruit Weevil

Diptera (flies)

*Currant or Gooseberry Fruit Fly
The Dark Currant Fruit Fly

Lepidoptera (moths and butterflies)

The Satyr or Hop Butterfly
The White Lined Sphinx
The Virginia Tiger Moth or
Yellow Bear
The Cypress Moth
California Tent Caterpillar
*Western Currant Span Worm
*Western Gooseberry Span Worm
The Currant and Gooseberry
Fruit Worm
*The Imported Currant Borer
The Fruit Tree Leaf Roller

Hymenoptera (wasps, bees and sawflies)

Gooseberry Sawfly
*Imported Currant Worm

*The more important currant and gooseberry insects.

AS MANY SUPERVISORS AS THE TRAFFIC WILL STAND

C. H. Johnson

Strong's article on "How Many Supervisors" leaves plenty of food for thought. We are all thinking along similar lines, but expressing ourselves differently. My answer would be stabilization through improved methods.

In every industry whether it be forestry, making automobiles, radios or digging ditches, there are periods of slackness and before each of said industries were developed to their present capacity there existed more protracted periods of slackness. New inventions and improvements stabilize the automobile industry by increasing the use of the automobile from a few months of the year to the entire year. In a like manner interference is being eliminated in the radio industry.

In blister rust work, as mentioned by Strong, we have good men and must rely on some sort of hypnotism or whatever we wish to term it to bring them back. Other men are not able to develop their true capacity because the period is too lengthy between acts. Our organization may also be suffering from some inferiority complex such as attempting to crowd a season's work into that short period when the sap is up or down the tree, or when Ribes are in full bloom. The important business of growing new forests is generally undertaken at a time before the blister rust men arrive and after they have departed from the field. Forest rangers generally supervise the burning of brush after our activities cease. New inventions and ideas may extend the period of activity for our camp bosses or supervisors from a four to a six, and possibly an eight-month period.

THEN AND NOW

W. V. Benedict

In 1924, the writer spent considerable time in British Columbia studying blister rust infections on Ribes and pine. Last month he was privileged to return, for the first time, on a short visit to Daisy Lake and Cheekye. Six years had elapsed and naturally he was interested in noting the change in the amount and intensity of blister rust infection.

His pilgrimage took him first to Chance Creek near Daisy Lake. In this locality in 1924, blister rust infection was exceptionally heavy. Most of the pines in the immediate vicinity, largely small trees under 20 feet in height, were literally plastered with cankers. No small number were then dead. The numerous Ribes bushes (R. lacustre and R. bracteosum) were heavily coated with infection. The larger pines (thrifty poles and standards) a short distance back from Chance Creek

and the heavy Ribes center were only lightly infected. One had to scrutinize a tree very closely to be aware of the presence of a canker.

What was the contrast here in 1930? All of the smaller pines infected in 1924 were dead. Spotted here and there, just protruding through the ground, was coming the second generation of pines, to become victims of the rust ere they were barely established.

The older pines a short distance away from heavy Ribes were now in a predicament similar to the smaller trees of 6 years ago. Heavy infection was abundant. Some trees were dead and many were dying. It was readily apparent that these thrifty poles were soon to pass out of the forest.

From Chance Creek a trip was made to the mature pine areas across the Cheakamus River near Daisy Lake. In 1924, no visible evidence of infection could be seen in the large trees by an observer on the ground. In 1930, the casual observer on the trail had no difficulty distinguishing infected trees.

Flags were everywhere in evidence, even in the tops of the largest trees. Occasional trees had their tops killed. None of the large trees were yet dead but their commercial usefulness was rapidly being impaired and one could see that it was but a question of a few more years before they too would be eliminated from the forest.

An examination of the large trees on the Brackendale area showed a repetition of what was seen at Daisy Lake. Large trees everywhere were dying from blister rust, where little damage was to be seen in 1924. Many trees, weakened by the rust, were being attacked by secondary fungi and their death hastened.

One going to British Columbia to see blister rust at work will return with a fuller appreciation of its deadliness to white pines of all sizes.

A RIBES GARDEN AT BERKELEY

H. R. Offord

Through the cooperation of the Department of Botany of the University of California, a Ribes garden, one acre in extent, is now being established in Strawberry Canyon, a half mile east of the University campus. During the pre-cambrian days of blister rust in California, Mr. Wyckoff was the proud sponsor of a Ribes garden which flourished in ground now dedicated to the pounding cleats of warring gridiron heroes. The difficulties in the way of a gracious tribute to S. N. Wyckoff, which would have resulted in the reestablishment of a Ribes garden on its former site can be readily appreciated by all who read and follow football. The writer feels confident that his decision to

locate the garden further up the canyon will not have to be accompanied by an exigency statement.

The purpose of the garden is twofold: (1) to establish under cultivation in one area a collection of Ribes which will give a phylogenetic cross section of the genus; (2) to provide material for chemical and morphological tests for the purpose of noting how certain key factors vary for the individual plants as they continue to grow under somewhat similar ecological conditions.

Our garden will be part of the general Botanical Garden in Strawberry Canyon and in so far as is practical will work in with the general landscaping scheme developed by the Department of Botany. In order to put the ground into proper shape, the area must be ploughed and graded, the present fence line changed to include our land and an extension made of the present pipe line for water. The cost of installation will not exceed one hundred and fifty dollars.

The proposed site appears to be a favorable one for growing Ribes and with plenty of water to hand it is expected that a creditable Ribes garden will soon be flourishing in the Berkeley hills.

As a matter of general interest it might be noted that the program of chemical investigations at Berkeley has obtained, through its University cooperators, the following facilities:

1. Office and chemical laboratory, Room 26, Giannini Hall.
2. Office and morphological laboratory in Room 2083, Life Science Building.
3. North half greenhouse No. 6.
4. Two transplant frames with 100 square feet of land on Oxford tract.
5. One acre of land for Ribes garden in Strawberry Canyon.

* * * * *

S. B. Detwiler and G. B. Posey of the Washington Office, and S. N. Wyckoff and C. C. Strong of the Spokane Office, attended a meeting at the University of Idaho November 7 and 8 called by Governor Baldrige of Idaho, to give technical advice on the blister rust situation in Idaho.

The meeting, attended by a number of persons from North Idaho and several from the state capitol at Boise, was called to inquire into the status of the Idaho blister rust situation.



December, 1930

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U. S. Department of Agriculture
Bureau of Plant Industry
Western Office of Blister Rust Control
Spokane, Washington

RIBES ERADICATION ON THE CLEARWATER NATIONAL FOREST.

1930

H. E. Swanson

Ribes eradication on the Clearwater National Forest was financed in part by the Office of Blister Rust Control and in part by the Forest Service. The former maintained the entire unit of four camps with a total of ninety-six men during June and during the balance of the season maintained one of the camps in which methods studies were carried on, and also provided technical supervision for the other three camps. Forest Service funds were used to maintain three of the camps during the balance of the season.

The operations were confined to the Musselshell District, the work being done principally upon the Lolo Creek and Eldorado Creek drainages. Some of the heaviest concentrations of Ribes petiolare and R. lacustre on the Clearwater Forest were encountered. Practically all the stream type was heavy with brush, making the difficulty factor high. Many of the tributaries to the main drainages were three to four miles in length, having R. petiolare practically to their source. Although a considerable amount of time, approximately 90 man-days, was spent in building trails into some of these areas, it was not advisable in all cases to do so. Consequently, a large amount of chemical had to be man-packed for considerable distances.

Both Atlacide and sodium chlorate were used by these camps. The sodium chlorate, requiring only a 5% solution, was used to great advantage on those areas where a two or three mile man-pack for chemical was necessary. Only 5 pounds of sodium chlorate was required where 14 pounds of Atlacide was necessary. Through proper supervision no accidents resulted from the great fire hazard accompanying the use of sodium chlorate. Sodium chlorate comes packed in 100-pound metal drums. Extreme care and precaution had to be taken in packing these drums by mules over some of the hot and dusty trails. It was our good luck that nothing happened. As these drums represent the last of Mr. Boll's cache at Bovill, there will probably not be much more of it used.

In the Methods Camp, the relative merits of power and knapsack spraying were compared. In past experiments, all comparisons were made by spraying the same area by both methods, results generally showing that knapsack spraying was the most successful. During the past season, a man was assigned to make some specific time studies, in order to determine the productive time (actual spraying time) of a laborer engaged in power spraying and in knapsack spraying. Results showed that knapsack spraying was 20% more effective as far as productive time was concerned than power spraying. This spraying was done on some of the heaviest concentrations of R. petiolare remaining on the Clearwater National Forest. The results of this summer's work demonstrate conclusively that knapsack spraying is the more successful method. There remain but a very few acres upon which it would be practical to use the power equipment. If a cheaper chemical is developed, leaving no

necessity for conservation of spray, but allowing a wide open nozzle and more or less broadcast spray, power methods will have an advantage.

The fire situation on the Musselshell District was not as quiet as in former years. In August two camps were called out on a fire for six days. In September all the men in one camp were taken over to the Selway National Forest for three days. Although the loss of time on eradication resulting from fires prevented the completion of certain blocks, we were fortunate that there were no more fires than there were, considering the number of electric storms which swept over the district during the summer.

The following is a brief summary of the field work:

TABLE NO. 1

SUMMARY OF CHEMICAL ERADICATION ON THE CLEARWATER NATIONAL FOREST, 1930

Method	Man Days	Gallons Chemical	Acres	Data, Per Acre			Total Cost
				Man Days	Gallons Chemical	Cost	
Power	460	12,186	316	1.45	38.6	\$14.43	\$4,559.53
Knap- sack	1,083	22,521	1,094	0.99	20.6	9.65	10,556.46
Total	1,543	34,707	1,410	1.09	24.6	\$10.72	\$15,115.69

TABLE NO. 2

SUMMARY OF HAND ERADICATION ON THE CLEARWATER NATIONAL FOREST, 1930

Man Days	Acres	Number Ribes	Data, Per Acre			Total Cost
			Man Days	Ribes	Cost	
2,682	3,266	805,572	0.82	247	\$5.49	\$17,869.02

TABLE NO. 3

SUMMARY OF ALL ERADICATION ON THE CLEARWATER NATIONAL FOREST, 1930

Acres Eradicated	Total Cost	Acres Partially Protected	Per Cent of Area Stream Type	Cost Per Acre to Eradicate	Cost Per Acre for Partial Protection
3,266	\$32,984.71	36,745	8.89	\$10.09	\$0.898

BACKFIRING
C. C. Strong

The author of "Elimination of Brush by Replacement", appearing in the November, 1930 issue of the Western Blister Rust News Letter, especially urged some backfiring. Let's call it constructive criticism, however, because backfiring, except on the fire line, usually retards progress as well as being a considerable shock to the constitution of the subject. Here goes!

Analysis of the cost of the cutting, piling, and burning operation, covering about 70 acres of the bottom land or stream type at Savenac Nursery having heavy brush and Ribes growth, showed an average of about \$67.00 per acre for this type of work. Following this there must be seeding of the area to grass and continued "mopping up" of Ribes until they are permanently suppressed. It is estimated that the total cost for clearing, burning, seeding and suppression of Ribes would be not less than \$100 per acre.

In Idaho it has been found that spraying and hand pulling over the heaviest Ribes and brush populated areas costs about \$24.00 per acre. Since the Savenac area has somewhat severer conditions than those existing on areas which have proven the greatest stumbling block in Idaho it is assumed that if conditions had been similar in Idaho to those at Savenac the Idaho cost would have been about \$30.00 per acre. Re-eradication operations in stream type cost 25% of the original Ribes eradication per unit area or \$7.50 per acre on this basis. Each successive covering of any stream type area to remove additional Ribes plants should cost less than the immediately preceding similar operation. However, there are no data available on this as yet. Assuming that there would not be a reduction it is readily seen that an area could be gone over by spraying and pulling crews at least ten times for the same amount which would be necessary to clear and convert areas to sod. What is the answer? Can the cost of clearing, which has been going on for centuries, be greatly reduced in the near future? Maybe. How about the probability of reducing Ribes eradication costs? Ribes eradication has been going on for only a few years and even the most doubtful of us must admit that in that short span of years the surface of "possible methods" could have been only scratched. To the author it seems that spraying and pulling must still be given the upper hand except in such cases as a useful crop is going to be produced year after year on areas cleared and seeded.

This brings up the very important question as to how extensively a useful crop on such areas could be utilized within the forest regions of the white pine belt. Last summer the Ribes eradication crew encountered such an area on Meadow Creek, a sub-drainage of Reed's Creek drainage, in the Clearwater Timber Protective Association. About 25 acres of the stream bottom had been cleared of brush some years back and the area plowed and seeded to timothy. There were heavy Ribes and brush concentrations immediately adjoining, both up and down stream. In August this meadow supported a very heavy crop of excellent quality,

hay running not less than 3 tons per acre. Doubtless this was a better crop than could be expected on the average. Why could not the United States Forest Service and the various protective organizations profit by growing their own hay on such areas right in the area where it would be used, thus eliminating some of the areas which most certainly will be the greatest obstacles to effective application of blister rust control? True, not many acres of each forest or association could be utilized for this purpose but after all there are not so many acres of these areas which support such a tangled mass of Ribes and brush.

It is assumed that roughly not less than 150 tons of hay is used each year on a forest such as the Clearwater National Forest. This is largely used in feeding pack animals, work stock and saddle horses. Wherever logging operations are under way great quantities of hay are required. At 150 tons of hay needed per year and setting the average yearly yield at 3 tons per acre, 75 acres of stream bottom could be utilized on the forest.

Clearing, plowing and preparing soil and seeding would cost roughly \$100.00 per acre. Maintaining improvements and machinery and haying would cost about \$25.00 per acre per year. The hay would be worth conservatively \$25.00 per ton at these central localities. The minimum gross return would be \$50.00 per acre per year and the net profit returned would be \$25.00 per acre per year. Thus the original investment would have been wiped off the books in about four years and Ribes would have been permanently suppressed.

Others have given considerable thought to this means of utilizing some of the stream type areas and possibly Johnson had this in mind when he began his experiment at Haugan. At any rate this plan is presented here in the earnest hope that some effort will be made to experiment along this line in the near future, preferably on one of the National Forests of north Idaho.

RIBES ROEZLI FOR THE GARDEN

Frank A. Patty

As a prolific bearer of fruits in optimum site conditions, Ribes roezli is probably excelled by few native western gooseberries. The bushes bear almost unbelievable crops of fruits which are as large as Lambert cherries when the blossoms and the tender twigs are not killed by heavy frosts. The berries which are borne on the two-year-old wood (wood of the previous season) are usually much larger than the ones which are borne on the older wood. The young bushes produce the largest fruits.

The flavor of the ripe R. roezli berries is quite delightful. When the fruits are made into jelly the resultant product has an individual flavor which is quite excellent and different from that of tame gooseberry jelly.

One has only to see this species fruiting to notice that there are differences in the individual plants, especially in the color of the

fruit and the length and stiffness of the prickles on the fruits. Horticulturists would probably separate this species into three horticultural varieties (not botanical) based on the color of the berries. The fruit of the first variety would have a shiny pinkish color that glistens in the sun, a second one would have a deep purplish-red fruit which would be quite dull and the third one would have a yellowish-orange color. It is usually easy to find other bushes which show different gradations of the three colors, all of which would indicate that crossing of these "varieties" was not uncommon. One very striking gradation to be found is a yellowish-orange berry which is flecked with pink markings and is probably the result of hybriding of the pink and the yellow "varieties".

The spines on the fruits of some of these bushes are often a half inch in length and quite stiff while on the other bushes the spines on the fruits are soft and very short. The fruits of the latter can be handled and readily eaten without any inconvenience whatsoever.

With a little careful breeding and selection work, it may be possible to develop a desirable spineless horticultural variety. Specimens of the pink, yellow and purple fruited varieties are to be planted in the famous Ribes gardens at Corvallis, Oregon and Berkeley, California. The plants will be watched with a great deal of interest to note whether they bear as prolifically as in their natural habitat, which is four to five thousand feet higher than the Ribes gardens at Corvallis and Berkeley.

BLISTER RUST SITUATION IN THE WEST IN 1930

E. L. Joy

Since blister rust was first discovered in the West in 1921, each annual scouting program has revealed new and startling information. The discovery each year of pine infection centers, with the determination of the probable year of origin of each, adds much to our knowledge of the extent of the rust in preceding years. Gradually we are piecing together the picture of blister rust spread as it actually occurred.

The first infected pines found in the western United States were discovered in a nursery at Mt. Vernon, Washington in 1921. By 1927 pine infection centers had been located in several scattered sections of the Olympic Peninsula as far south as the end of Hood's Canal, in the Cascade Mountains south to Mt. St. Helen's, and in southeastern British Columbia. All of these infections originated during or before 1923.

In 1928 and 1929 new centers of 1923 origin were located in the Mt. Hood region of Oregon and in the Inland Empire near Newman Lake, Washington, Clarkia and Elk River, Idaho. One center of 1927 origin was located near Headquarters, Idaho.

Scouting work done the past year has revealed several new infection centers which add materially to our knowledge of the extent and

intensity of the disease in the West. Following is a tabulation of all pine infections found in 1930.

PINE INFECTIONS FOUND IN 1930

State	County	Location	Probable Year of Origin
Washington	Pierce	Rainier National Park, Tahoma Creek	1923
		Rainier National Park, Nisqually River, Longmire	1923
	Lewis	Rainier National Forest, T. 15 N., R. 6 E., Sec. 36; R. 7 E., Sec. 31; T. 14 N., R. 6 E., Sec. 1; R. 7 E., Sec. 6	1927
	Skamania	6 miles west of Wind River Nursery	1927
Oregon	Lane	Santiam National Forest, near Independence Ranger Station, south-west of Mt. Jefferson	1923
Idaho	Clearwater	Johnson Creek near Elk River, P.T.P.A., T. 40 N., R. 2 E., Sec. 19	1927
		Shattuck Creek near Elk River, P.T.P.A., T. 40 N., R. 2 E., Sec. 28	1927
		Cameron Creek near Elk River, P.T.P.A., T. 40 N., R. 2 E., Sec. 31	1927
		Cameron Creek near Elk River, P.T.P.A., T. 40 N., R. 1 E., Sec. 25	1927
		North fork Reed's Creek near Headquarters, C.T.P.A., T. 38 N., R. 5 E., Sec. 15	1927
		Quartz Creek near Headquarters, C.T.P.A., T. 37 N., R. 5 E., Sec. 5	1927
		Beaver Creek near Headquarters, Clearwater National Forest, T. 40 N., R. 7 E., Sec. 7	1927
		Rhodes Creek near Pierce, C.T.P.A., T. 37 N., R. 5 E., Sec. 36	1923
		Orofino Creek near Pierce, C.T.P.A., T. 36 N., R. 5 E., Sec. 13	1927
	Shoshone	Hammond Creek, 6 miles northeast of Avery, St. Joe National Forest, T. 46 N., R. 5 E., Sec. 25, 26	1927
		Merry Creek near Clarkia, Coeur d'Alene T.P.A., T. 42 N., R. 2 E., Sec. 33	1927

The results of our 1930 work have again extended the area covered by the disease in 1923. Goodding reports "the most southerly pine infection in the West", undoubtedly of 1923 origin, located in the Cascades southwest of Mt. Jefferson near Independence Prairie Ranger Station. This extends the limits of the 1923 wave approximately one-fourth the

distance through Oregon and into the northern end of the sugar pine region. In the Inland Empire a center of 1923 origin near Pierce, Idaho extends the line to the southern limit of the commercial white pine belt.

Other discoveries made in 1930 clearly show the rapidity with which the disease is intensifying and spreading. One of these is the pine infection center of 1927 origin found northeast of Avery, Idaho in the St. Joe National Forest. Several Ribes infections were found in this vicinity, indicating heavier and possibly older pine infection than was located. This locality is approximately 7 miles from the Idaho-Montana line.

Another infected locality is that in which the Savenac Nursery at Haugan, Montana is located. Four Ribes infections, $1\frac{3}{4}$ to 6 miles from the Nursery, were found this year. Although no pine infection has been located in this vicinity the discovery of Ribes infections helps to stress the absolute necessity of protecting the pines now growing in the Nursery.

A summary of the 1930 scouting work brings to our attention three very vital points which must be taken seriously in planning future control work. They are (1) the spread of the disease as early as 1923 into the northern end of the sugar pine belt of Oregon and California; (2) the spread of the disease in the same year to the southern limits of the Inland Empire commercial white pine belt, and (3) the threatening of our two northwest forest nurseries by blister rust, which has been found within 6 miles of each.

THE "GYFFO" KNOCKS AT THE DOOR

B. A. Anderson
W. G. Guernsey
H. E. Swanson

During the last eight years members of the Office of Blister Rust Control have used every effort to cut the costs of control work on white pine lands to a minimum. Every idea which gave the slightest possibility of decreasing costs has been carefully gone over and tested in the field. Ideas which were greeted with a half-concealed smile of doubt of their practicability have been given a trial, and the cheerful part of the picture is that some of those ideas are now a part of our regular eradication routine work. The use of string in place of paper for marking strip boundaries is an example.

A check of the records for the last two years shows that no outstanding steps have been taken to cut either hand or chemical eradication costs to any appreciable extent. Eradication costs seem to have approached an irreducible minimum with our present methods. It is quite certain that

we cannot look for an increase in the quality of temporary personnel; in fact there is a possibility of a decrease in quality because as the blister rust program continues to increase, it is going to become more and more difficult to secure the additional number of men needed. So if we expect to reduce eradication costs - which we certainly will in one way or another - we must look to improved methods.

Temporary employees have always been paid on a daily or monthly basis. What would happen if the Office of Blister Rust Control should adopt a piece work plan of payment for work accomplished; in other words adopt the "gyppo" plan of the logging camps.

We all have visited logging camps and mentally catalogued the status of the men as we looked over the operations. We passed a loading crew, the men literally running with the loading lines - back to the deck for the next sling load. We know they are "gyppos" without being told. Our tour continued until a set of fallers is reached. The saws have a lazy, droning, soothing tone which seems to say "today - tomorrow - today - tomorrow, etc." Mentally we say "day labor". If that had been a gyppo gang of sawyers the saws would have said as they literally vomited the long shavings "two bits, four bits, two bits, four bits". Isn't it quite probable that our temporary personnel in the eradication camps has the same apathetic attitude towards the work as the day laborer has in any other situation?

System of Wage Payments

There are a large number of ways of determining wage payments but practically all could be grouped under one of the following heads:

1. Day work.
2. Piece work.
3. Gain sharing or bonus system.

Day work is probably most efficient where the day's output is controlled by machinery. It does not foster a desire in the men to increase output or cultivate personal initiative. The system tends to slow down the work of the more skillful to the rate of average.

A wage payment plan based on piece work is suitable to an industry where the various processes in manufacturing a certain article have been standardized. Such a system tends to apportion wages according to work done. It is simple in operation. However, where the system has been used in going concerns where time studies of each operation have not been carefully made and standardized, it tends to produce discontented workmen. If the initial piece payment is too high it is difficult to change rates without losing the loyalty and confidence of the workmen.

The gain sharing or bonus system seems to be the most satisfactory system of wage payment plans. The employee's wages are increased by a

certain percentage of the profit resulting in doing a given task under a certain specified time or cost. A thousand modifications of this plan are found in the nation's industries, each one varying to meet a slightly different situation.

Benefits Accruing to the Men

After men have worked at a given task for a time they develop a certain rhythm and speed which does not materially change. A knowledge of the average time of doing a piece of work in any particular place is far more prevalent among workmen than is generally supposed. Each man has dreams of being a captain of industry some day, but unless he can see immediate benefits of increased effort, he is slow in starting toward the top. What the worker wants is:

1. A fair day's pay for a fair day's work.
2. Opportunities to take responsibility.
3. A wage proportioned to production.
 - a. An inferior worker wants as good a wage as the average.
4. Work that he enjoys and can do well.
5. Recognition of good work done.
6. Promotion according to good work and length of service.
7. A chance to advance in efficiency and to make good on the job.

A bonus system meets all of these wants with a flexibility that can never be reached by the day wage plan.

Benefits Accruing to the Blister Rust Office

In the last analysis a wage plan must recognize the economic principle that output per man is the objective of every employer. A "gyppo" system tends to do just that. Not only would it add a stimulus to the worker, but it would inculcate a better spirit into the men and tend to increase the quality of the personnel. Men who are working for group profits would keep a vigilant eye on the fellows and incompetent men would be noticed at once and discharged. Also the men would exercise their creative ability to its fullest extent if immediate benefits would result. A minimum of supervision would be required which would constitute a saving to the pine owner.

Adaptability of "Gyppo" Plan to Blister Rust Work

Blister rust work is not standardized but the cost of eradicating the Ribes from any particular white pine site can be estimated quite accurately. What would be the objections to setting aside a drainage, estimating the eradication costs and allow a reliable camp boss to "gyppo" the eradication work?

BLISTER RUST WAREHOUSE

Aaron H. Glasgow

In the past our warehouse has been merely a designated place in which all field equipment has been piled or dumped until the next field season.

This summer our warehouse space was enlarged by some 1,100 square feet, part of which has been fitted up for a work and repair shop. This new addition can be heated, thus enabling us to carry on our overhauling and repairing of equipment in the cold weather. These added facilities created an urge for complete classification and order in the winter storing of all supplies.

Geil and Whiting have been busy for some time building cupboards, racks, and shelves, where we can store like articles together. Classifying will then divide the smaller items into "camp ware" and "spraying outfits and parts". Tanks, stoves, tents and flies, tools, lock boxes and power sprayers and hose will all have special racks and places.

As far as possible all equipment will be stored in the old warehouse and the heated addition be kept clear in order to have room to spread canvas and equipment in the process of being repaired.

Furthering this program of progress and efficiency, it is the plan to standardize all equipment purchased in the future, and select camp equipment which will fit together or unite closely, thus saving space and time in packing and moving and also requiring less warehouse space in storing. The warehouse will be locked and everything taken or checked out must be signed for by the party responsible. When property is returned it must be accompanied by a tag or list, giving the contents of each bundle and person to whom it is charged. This procedure will enable proper credit to be given in the case of two persons sending equipment to the warehouse in one load - a thing which has happened many times in the past, making it impossible for the warehouseman to give proper credit to persons charged, even with the assistance of the truck driver who picked up the property.

When property is issued in the spring, as far as possible uniform sized bundles or bales will be sent out, along with a memorandum to consignee requesting that in returning property the same numbers should be tied or baled together. Such articles as blankets, tarps, and ticks come under this rule, and of course all tents and flies should be folded and tied with the dimensions and name appearing outside and easily visible. This is another resolution usually broken in the past. Since it is quite an undertaking to fold a large tent, on the tag attached should be a note of any repairs needed to be made, or if condition is O.K.

By getting the cooperation of all concerned, much assistance will

be gained in the handling of equipment and more efficient records maintained as to property charged and credited upon return.

Our term "warehouse" in the past has certainly been defined correctly by Webster's International as follows: "The term is broadly used and may include any structure used to store goods in".

Resolved: To make our warehouse a store house for equipment with "a place for everything, and everything in its place".

BIRDS AND RIBES NEVADENSE SEEDS

Frank A. Patty

At different times there has been considerable discussion by certain members of the office pertaining to the dissemination of Ribes seeds by birds. Some have held that seeds will pass through the digestive tract of birds without being injured while others have said that seeds would be ground to bits in the gizzards of the birds. To my knowledge none of them have presented evidence to prove or disprove their theories.

During the past summer the writer and Clarence Quick collected seeds of Ribes nevadense which had been eaten by birds and passed through the digestive systems apparently unharmed. Much to our surprise small pieces of the tough outer skin were also found mixed with the seeds. Apparently the birds which were feeding on the R. nevadense berries had been gorging themselves. Unfortunately only a small number of these seeds were collected but germination tests will be run on them to determine whether or not they are still viable. Many of the seeds were found on rocks and stumps in places where they were exposed to the direct rays of the hot sun for several days. However, a small number of the seeds were found in sheltered places and it is these seeds that offer the better germination possibility.

A few seeds which have not been identified were found mixed with the Ribes seeds. They too seemed to be in perfect condition despite their hazardous trip through the digestive systems of the birds.

QUARANTINE INTERCEPTIONS

G. A. Root

That blister rust hosts are still carried to a considerable extent by the traveling public via automobiles is evidenced by reports from the California State Department of Agriculture. At the border stations on the California-Oregon line during September, the following material was taken: 17 lots of 5-needled pines from Oregon; 3 from Washington; 2 from Idaho; 1 from Montana, and 1 from Canada - during October, 12 lots of pine from Oregon; 7 from Washington; 2 from Montana, and 1 from Canada. In addition 2 lots of Ribes were taken from Oregon. The reports show from what particular locality in each state material was taken and to what part of California such was destined.

